

# Kansas Department of Health & Environment

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## **WATER WELL HANDBOOK/APPLICATION**



Bureau of Water – Geology Section  
1000 SW Jackson St., Ste. #420  
Topeka, Kansas 66612-1367  
(785) 296-5524

November 2002

# Water Well Contractors Study Guide and Handbook

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## Geology Section

**Underground Hydrocarbon and Natural Gas Storage  
Underground Injection Control (UIC)  
Water Wells**

Bureau of Water.

Geology.

Industrial Programs.

Livestock  
Management.

Municipal Programs.

Public Water Supply.

Technical Services.

Watershed  
Management.

Watershed Planning  
and TMDL Programs.

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### Purpose of the Geology Section

The Geology Section within the Bureau of Water administers the Underground Injection Control (UIC), the Underground Hydrocarbon and Natural Gas Storage, and Water Well Licensing, Water Well Construction and Abandonment Programs. These programs protect public health and safety, and the environment.

The UIC Program regulates injection well activities. Injection well activities include the disposal of industrial wastes into deep geologic formations, the solution mining of salt formations, and the shallow injection of non-hazardous fluids below the land surface.

The Underground Hydrocarbon and Natural Gas Storage Program regulates the

storage of hydrocarbons, including liquefied petroleum gas (LPG) and natural gas, in salt caverns formed by solutioning in the Hutchinson Salt. The program also regulates the brine ponds associated with the underground storage facilities.

The Water Well Program regulates water well contractor licensing, water well construction, and water well abandonment.

The Geology Section also provides hydrogeological and technical support for other programs in the Bureau of Water.

Return to:  
Kansas Dept. of Health & Environment  
Bureau of Water - Geology  
Curtis Bldg. - 1000 SW Jackson, Ste. 420  
Topeka, Kansas 66612-1367

Application No. \_\_\_\_\_  
(Please leave blank)

(Type or print in ink)

## APPLICATION FOR WATER WELL CONTRACTOR LICENSE

Date \_\_\_\_\_

(A) 1. I, \_\_\_\_\_ of \_\_\_\_\_

\_\_\_\_\_  
(City) (County) (State) (Zip)

Do hereby make application for a license to do business as a water well contractor in the State of Kansas.

2. I intend to do business as a (an) \_\_\_\_\_  
(Individual, Firm, Partnership, Corporation)

under the business name of \_\_\_\_\_

\_\_\_\_\_  
(Street address or P.O. Box) (City) (State) (Zip)

Business Phone \_\_\_\_\_ Home Phone \_\_\_\_\_

3. Age of Applicant \_\_\_\_\_. Length of residence in Kansas \_\_\_\_\_ Years.

### (B) Experience

#### (1) Individual Drillers:

a. Commenced drilling water wells on or about \_\_\_\_\_.  
(Date)

b. Years of Experience in the capacity of:

Driller \_\_\_\_\_ Foreman \_\_\_\_\_ Tool Pusher \_\_\_\_\_

c. Approximate number of types (domestic, irrigation, industrial, municipal) of water wells drilled during past five (5) years.

\_\_\_\_\_  
\_\_\_\_\_

During past year \_\_\_\_\_

#### (2) Firm, Partnership, Corporation:

Give the name of each driller and a record of his experience on a separate sheet.

- (C) If licensed in another state, name the state and license number and issuing agency, agency address and phone number. \_\_\_\_\_
- \_\_\_\_\_
- (D) References: Three (3) references on Kansas Department of Health and Environment form WWC-2, are required. One must be from another water well contractor and two from persons not related to you.
- (E) Drilling Equipment: Attach a complete copy of Kansas Department of Health and Environment form WWC-3 for each drill rig operated by or for you.

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### AFFIDAVIT

I hereby certify that the statements made in this application and attachments, which are part of hereof, are true and correct to the best of my knowledge and belief.

\_\_\_\_\_  
(Applicant's Signature)

Subscribed and sworn to before me this \_\_\_\_\_ day of \_\_\_\_\_.

\_\_\_\_\_  
(Notary Public)

My commission expires: \_\_\_\_\_

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To be complete, the following must accompany this application:

1. A \$10.00 application fee, check, bank draft or money order, payable to the Kansas Department of Health and Environment.
2. Three references on form WWC-2 provided.
3. Description of each drill rig on form WWC-3 provided.
4. Upon completion and passing of examination, if required, a \$100.00 contractor's license fee and a \$25.00 drill rig fee (a \$25.00 fee is required for each drill rig operated by or for you) is due, payable by check, bank draft or money order to the Kansas Department of Health and Environment.

CHARACTER AND EXPERIENCE REFERENCE QUESTIONNAIRE FOR:

TO: KS Dept. of Health & Environment \_\_\_\_\_  
Bureau of Water - Geology (Applicant's Name)  
Curtis Building \_\_\_\_\_  
1000 SW Jackson, Ste. 420 (Address)  
Topeka, KS 66612-1367 \_\_\_\_\_  
Phone: (785) 296-5524 (City/State/Zip Code)

Answer each question accurately so that we may ascertain the applicant's qualifications for the Water Well Contractor's license.

1. I have known the applicant for \_\_\_\_\_ years.
2. Are you related to the applicant? No \_\_\_\_\_ Yes \_\_\_\_\_
3. What is the nature of your acquaintance, relationship, or association? \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
4. From personal knowledge, I know that his business reputation is \_\_\_\_\_.
5. What is your opinion of the applicant's personal character, honesty, and reliability?  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
6. Do you consider the applicant to be a qualified and experienced water well driller?  
\_\_\_\_\_ Yes, \_\_\_\_\_ No. Please comment on the applicant's ability and qualifications  
to construct water wells. \_\_\_\_\_  
\_\_\_\_\_

I hereby certify that the above information is true to the best of my knowledge and belief.

\_\_\_\_\_  
(Signed)

\_\_\_\_\_  
(Date)

\_\_\_\_\_  
(Occupation)

\_\_\_\_\_  
(Address)

\_\_\_\_\_  
(City, State, Zip)

WWC-2

CHARACTER AND EXPERIENCE REFERENCE QUESTIONNAIRE FOR:

TO: KS Dept. of Health & Environment \_\_\_\_\_  
Bureau of Water - Geology (Applicant's Name)  
Curtis Building \_\_\_\_\_  
1000 SW Jackson, Ste. 420 (Address)  
Topeka, KS 66612-1367 \_\_\_\_\_  
Phone: (785) 296-5524 (City/State/Zip Code)

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2. Are you related to the applicant? No \_\_\_\_\_ Yes \_\_\_\_\_
3. What is the nature of your acquaintance, relationship, or association? \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
4. From personal knowledge, I know that his business reputation is \_\_\_\_\_.
5. What is your opinion of the applicant's personal character, honesty, and reliability?  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
6. Do you consider the applicant to be a qualified and experienced water well driller?  
\_\_\_\_\_ Yes, \_\_\_\_\_ No. Please comment on the applicant's ability and qualifications  
to construct water wells. \_\_\_\_\_  
\_\_\_\_\_

I hereby certify that the above information is true to the best of my knowledge and belief.

\_\_\_\_\_  
(Signed)

\_\_\_\_\_  
(Date)

\_\_\_\_\_  
(Occupation)

\_\_\_\_\_  
(Address)

\_\_\_\_\_  
(City, State, Zip)

WWC-2

CHARACTER AND EXPERIENCE REFERENCE QUESTIONNAIRE FOR:

TO: KS Dept. of Health & Environment \_\_\_\_\_  
Bureau of Water - Geology (Applicant's Name)  
Curtis Building \_\_\_\_\_  
1000 SW Jackson, Ste. 420 (Address)  
Topeka, KS 66612-1367 \_\_\_\_\_  
Phone: (785) 296-5524 (City/State/Zip Code)

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1. I have known the applicant for \_\_\_\_\_ years.
2. Are you related to the applicant? No \_\_\_\_\_ Yes \_\_\_\_\_
3. What is the nature of your acquaintance, relationship, or association? \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
4. From personal knowledge, I know that his business reputation is \_\_\_\_\_.
5. What is your opinion of the applicant's personal character, honesty, and reliability?  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
6. Do you consider the applicant to be a qualified and experienced water well driller?  
\_\_\_\_\_ Yes, \_\_\_\_\_ No. Please comment on the applicant's ability and qualifications  
to construct water wells. \_\_\_\_\_  
\_\_\_\_\_

I hereby certify that the above information is true to the best of my knowledge and belief.

\_\_\_\_\_  
(Signed)

\_\_\_\_\_  
(Date)

\_\_\_\_\_  
(Occupation)

\_\_\_\_\_  
(Address)

\_\_\_\_\_  
(City, State, Zip)

WWC-2

APPLICATION NO. \_\_\_\_\_

RETURN TO:

KDHE - Division of Environment  
Bureau of Water, Geology  
1000 SW Jackson, Ste. 420  
Topeka, Kansas 66612-1367  
(785) 296-5524

APPLICATION FOR  
KANSAS WATER WELL CONTRACTORS DRILLING RIG LICENSES  
(Please type or print in ink)

Date: \_\_\_\_\_, 2003

Applicant's Name: \_\_\_\_\_

Business Name: \_\_\_\_\_

Business Address: \_\_\_\_\_

Present Drilling Rig(s) License Numbers(s) (Not the automobile license number)

\_\_\_\_\_

Give detailed description of each drilling rig operated by or for you or drilling tools used in constructing water wells (make, model, year, size, rotary, churn, etc.), and detailed description (make, model, year, size, etc.) of the vehicle on which the drilling rig is mounted or in which your drilling tools are carried if you hand dig or drive water wells.

Rig: \_\_\_\_\_ Year: \_\_\_\_\_  
(Make / Model)

Mounted On: \_\_\_\_\_ Year: \_\_\_\_\_  
(Make / Model)

Rig: \_\_\_\_\_ Year: \_\_\_\_\_  
(Make / Model)

Mounted On: \_\_\_\_\_ Year: \_\_\_\_\_  
(Make / Model)

Rig: \_\_\_\_\_ Year: \_\_\_\_\_  
(Make / Model)

Mounted On: \_\_\_\_\_ Year: \_\_\_\_\_  
(Make / Model)

**Include payment of \$25 for each rig operated by or for you.**

Rig: \_\_\_\_\_ Year: \_\_\_\_\_  
(Make / Model)

Mounted On: \_\_\_\_\_ Year: \_\_\_\_\_  
(Make / Model)

Rig: \_\_\_\_\_ Year: \_\_\_\_\_  
(Make / Model)

Mounted On: \_\_\_\_\_ Year: \_\_\_\_\_  
(Make / Model)

Rig: \_\_\_\_\_ Year: \_\_\_\_\_  
(Make / Model)

Mounted On: \_\_\_\_\_ Year: \_\_\_\_\_  
(Make / Model)

Rig: \_\_\_\_\_ Year: \_\_\_\_\_  
(Make / Model)

Mounted On: \_\_\_\_\_ Year: \_\_\_\_\_  
(Make / Model)

Rig: \_\_\_\_\_ Year: \_\_\_\_\_  
(Make / Model)

Mounted On: \_\_\_\_\_ Year: \_\_\_\_\_  
(Make / Model)

Rig: \_\_\_\_\_ Year: \_\_\_\_\_  
(Make / Model)

Mounted On: \_\_\_\_\_ Year: \_\_\_\_\_  
(Make / Model)

Rig: \_\_\_\_\_ Year: \_\_\_\_\_  
(Make / Model)

Mounted On: \_\_\_\_\_ Year: \_\_\_\_\_  
(Make / Model)

Rig: \_\_\_\_\_ Year: \_\_\_\_\_  
(Make / Model)

Mounted On: \_\_\_\_\_ Year: \_\_\_\_\_  
(Make / Model)

## STUDY GUIDE

### Sample Questions and Explanation

The following items are representative of the questions that will be on the Water Well Contractor's License Examination.

1. Article 12. - Kansas Groundwater Exploration and Protection Act (K.S.A. 82a1201 - 82a1215) as amended. This article is a law which established licensure of water well contractors who construct, reconstruct or treat water wells in Kansas and established the propagation of rules and regulations on minimum construction, reconstruction, treatment and plugging of any water wells in Kansas. This Article contains definitions, procedures, and outlines the parameters and guidelines within which all water well contractors in Kansas and landowners are required to follow.

#### SAMPLE QUESTIONS on Article 12.

- |        |   |
|--------|---|
| T or F | Does the Kansas Department of Health and Environment have general supervision and authority over the construction, reconstruction, treatment and plugging of all water wells?   |
| T or F | Does an individual who performs labor or services for a licensed water well contractor need a water well contractors license?   |
| T or F | The term of a water well contractors license is from January 1 through the 31st day of December?  |
| T or F | Does an individual who constructs a water well on land which is owned by him or her have to construct their water well according to the minimum well construction standards established by the Kansas Groundwater Exploration and Protection Act and all other rules and regulations? |
| T or F | Does all acts necessary to obtaining groundwater by any method for any use including the location of and excavating for the well mean "construction of a water well"?   |
| T or F | If a complaint is filed against a water well contractor and before revocation or suspension of the water well contractor's license, is the contractor afforded the opportunity to bring the well up to standard or to correct the error which caused the complaint?                   |
| T or F | Can the Department request a water sample from any well that you have constructed or reconstructed?   |
| T or F | Do all test holes drilled by you in search for a groundwater supply have to be plugged by you before the job is terminated?   |
2. Article 30. - Water Well Contractors License, Water Well Construction and Abandonment rules and regulations (K.A.R. 28-30-1 through 28-30-10) as amended. This article is the rules and regulations which were propagated by the statute (Article 12) and set forth the procedures on licenses, renewal of licenses, definitions as they relate to water wells, and minimum construction, reconstruction, treatment or plugging

of all water wells in Kansas, except public water supply wells and wells located within sanitation zones around reservoirs.

SAMPLE QUESTIONS on Article 30.

What is an aquifer?  
What is an unconfined aquifer?  
What is a confined aquifer?  
What is a pitless well adapter?  
What is a pitless well unit?

Yes or No Does the casing of a well that utilizes a pitless well adapter have to terminate above ground level?  
If yes, by how much? \_\_\_\_\_.

Yes or No Are you required to furnish a copy of the water well record on the construction, reconstruction or plugging of any well to the landowner?

Which water wells listed below are required to be disinfected. (Place a check mark or "X" the correct ones)

<input type="checkbox"/> Domestic	<input type="checkbox"/> Gas station well
<input type="checkbox"/> Irrigation	<input type="checkbox"/> Stock well at building site
<input type="checkbox"/> Public water-supply	<input type="checkbox"/> Oil field water-supply

How does one eliminate contamination from a water well?

What is a reconstructed water well?

What type of water well casing are approved?

T or F Stove pipe is considered to be a durable, clean, serviceable casing?

3.i) Water Well Record (Form WWC-5) - The copy provided is the record that you are required to completely fill out on how you constructed, reconstructed, or plugged any water well in Kansas and have it submitted to the Department and landowner within thirty (30) days after you have constructed, reconstructed or plugged any well.

SAMPLE QUESTIONS on Well Record.

Describe a limestone.  
Describe a shale.  
Describe a sand.  
Describe a clay.  
Describe a soil.

Give a legal description of a location for a water well.

What are grain sizes of sand and gravel? Are grain sizes important in the lithologic description? If yes, explain why.

- 6.a) Kansas Statutes Pertaining to Public Water Supply. You should know K.S.A. 65-161, K.S.A. 65-162a, and K.S.A. 65-163(a).

**SAMPLE QUESTIONS on Public Water Supply Statutes.**

What is the definition of a public water supply system?

Can you construct a public water supply well without the supplier of the water first obtaining a public water supply system permit?

- 6.b) Requirements for Public Water Well Location, Construction and Disinfection. There are the standards that have to be followed as the minimum requirements when you construct a public water supply well and also construct the well according to the plans, specifications and requirements as approved by the department which are required to be submitted to the department for approval by the supplier or owner of the public water supply system first before any construction is done on such system.

**SAMPLE QUESTIONS on Requirements for Public Water Well Location, Construction and Disinfection.**

T or F      The well shall not be located in a ravine where surface water flows may be obstructed or concentrated?

What is the minimum depth that the watertight well casing may be placed below the ground surface on any public water well?

You obtain a permit to construct a public water supply well from whom?

If the steel casing to be installed in a public water well is six (6) inches in outside diameter, what size is the bore hole required to be?

Flood waters from any surface water source shall not approach closer than \_\_\_\_\_ feet to the well?

A completed public water supply well shall be disinfected by adding sufficient hypochlorite solution to the well water to produce a concentration of not less than \_\_\_\_\_ milligrams per liter (mg/l) of available chlorine when mixed with the water in the well.

What is the time period, in hours, that shall be allowed for the curing of cement grout or neat cement grout?

Why is a permit needed to construct a public water supply well?

- 6.e) Regulations Governing the Operation of Public Water Supply Systems (28-15-11 through 28-15-20). You will have to know regulation 28-15-16 and 28-15-17 which are on pages 16 and 17. Read the rest of these regulations for your general knowledge.
- 6.f) Instructions for Making Application to Obtain a Public Water Supply Permit for a Well. Know this document very well.
- 6.h) Public Water Supply Permit Application. This document is provided to you for your

reference so you will know what a permit application looks like and what information we require so approval can be given for construction of a public water supply well. If you are uncertain whether the supplier of the proposed public water supply system has approved from the Department ask the supplier (or owner of the system) to show you the letter of approval sent to the supplier by the Department.

- 7.b) The Water Appropriation Act. This Act established procedures and requirements which users of our water supplies (surface and groundwater) have to obtain a water right (appropriated or vested right) to use the water for some beneficial purpose.

**SAMPLE QUESTIONS on the Water Appropriation Act.**

What is a water right?

To what agency do you make application for a water right?

Who is required to obtain a water right?

To whom does the groundwater in Kansas belong to?

- 7.g) Sanitation Zone Regulations. (Bulletin No. 4-7.) This bulletin contains the regulations which pertain to any water wells constructed within the boundaries of sanitation zones around reservoirs. You should study 28-10-79 on page 34, 28-10-86 on page 38, 28-10-100 through 28-10-102 on pages 41 through 45. Do not get these regulations confused with those in Article 30.

## Information for Examination Packet

1. Article 12
2. Article 30
  - a) Nemaha/Brown County Construction Requirements
  - b) Burrton/Hollow-Nikkel Area Special Requirements - May 1, 1987
  - c) Policy Statements
3. Diagrams
  - a) Standard Cased Test Hole
  - b) Well Head Completion Diagram (submersible with pitless)
  - c) Well Head Completion Diagram (submersible without pitless)
  - d) Well Head Completion Diagram (irrigation above ground discharge)
  - e) Standard Monitoring/Observation Well Design
  - f) Fractional Legal Description/Location Diagram
  - g) Dug Well Reconstruction Diagram
  - h) Dug Well Open Hole
  - i) Water Well Record (WWC-5)
  - j) Heat Pump Diagrams (3)
  - k) Official Code Sheet
4. Plugging Diagrams and Information
  - a) Selected Sections
  - b) Diagrams (1-11)
  - c) KDHE Requirements for Plugging Abandoned Water Wells
  - d) Sample Plugging Report
5. Water Quality Information
  - a) Sample Bacterial Report
  - b) Significance of Water Mineralization
  - c) Disinfection Table and Graph
  - d) Methods of Chlorinating Private Water Supplies
  - e) Map of District Geologists
6. Public Water Supply
  - a) Kansas Statutes Pertaining to Public Water Supply
  - b) Requirements for Public Water Well Location, Construction and Disinfection
  - c) Public Diagram with Pitless
  - d) Public Diagram Above Ground
  - e) Public Water Supply Regulations
  - f) Instructions for Making Application to Obtain a Public Water Supply Permit for a Well
  - g) Water Quality Tests Required Prior to Addition of New Public Water Supply Sources
  - h) Public Water Supply Permit Application
7. Water Appropriation
  - a) Map of Field Offices
  - b) Water Appropriation Act
  - c) Rules and Regulations
  - d) Fee Schedule
  - e) Sanitation Zone Regulations

KANSAS DEPARTMENT OF HEALTH AND ENVIRONMENT  
WATER PROGRAM DISTRICT OFFICE STAFF  
April 2001



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2301 E. 13th  
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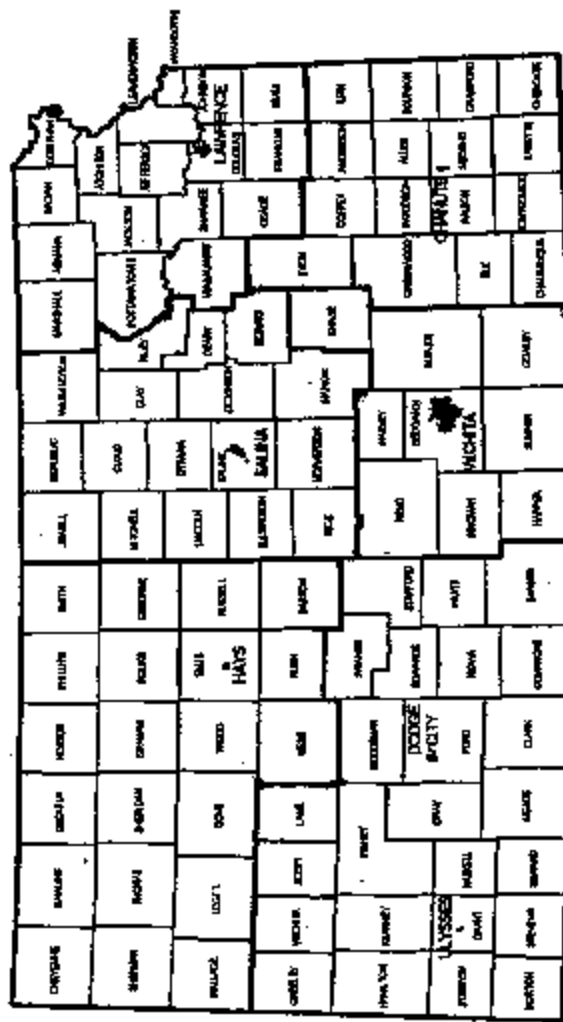
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Rick Brunetti District Environmental Adm.  
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Max Richard Environmental Technician  
Jennifer Nichols Agricultural Technician  
Don Chisam Agricultural Technician LEPP

**South Central District--(316) 337-6020**  
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Mark Bradbury District Environmental Adm.  
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Julia Hooper Agricultural Technician  
BJ Hope Agricultural Technician

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Claudia Ekins Agricultural Technician  
Dean Goodell Agricultural Technician  
Scott Shields LEPP

**Southeast District--(620) 431-2390**  
1500 W. 7th St.  
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David Slutt Dist. Environmental Adm.  
Rex Heape Water District Engineer  
Greg Taylor Environmental Technician  
Chuck Gatchell Environmental Technician  
Jennifer McDermott Agricultural Technician

STATE OF KANSAS  
DEPARTMENT OF HEALTH AND ENVIRONMENT

**ARTICLE 12**  
**GROUNDWATER EXPLORATION**  
**AND PROTECTION ACT**

EFFECTIVE SEPTEMBER 28, 1993



Bureau of Water - Geology Section  
1000 S. W. Jackson St., Ste. 420  
Topeka, Kansas 66612-1367  
785/296-5524

## ARTICLE 12

### Groundwater Exploration and Protection Act

**82a-1201. Title.** This act shall be know as the “Kansas groundwater exploration and protection act”.

History: L. 1973, ch. 417, § 1; July 1.

**82a-1202. Declaration of purpose.** It is the purpose of this act to provide for the exploration and protection of groundwater through the licensing and regulation of water well contractors in Kansas to protect the health and general welfare of the citizens of the state; to protect groundwater resources from waste and potential pollution by requiring proper description of the location, drilling and well construction, and proper plugging of abandoned water wells and test holes; and to provide data on potential water supplies through well logs, well pumping tests and water quality tests which will permit the economic and efficient utilization and management of the water resources of this state.

In order to achieve these objectives, this act requires licensing of water well contractors; provides for the establishment of standards for well construction, reconstruction, treatment and plugging; requires each licensed water well contractor to keep and transmit to the state, upon request, a copy of the log of the well, pump test data if available, and water quality samples, and maintains within the state geological survey of Kansas a record system of well logs and water quality data which will be available to the public.

History: L. 1973, ch. 417, § 2; L. 1979, ch. 334, § 1; July 1.

**82a-1203. Definitions.** As used in this act, unless the context otherwise requires:

- (a) “Construction of water wells” means all acts necessary to obtaining groundwater by any method for any use including, without limitation, the location of and excavation for the well.
- (b) “Person” means any individual, association, firm, partnership, corporation or governmental entity.
- (c) “Sand point” or “well point” means any driven well which is 25 feet or less in depth and is constructed by manually driving into the ground a drive point fitted to the lower end of tightly connected sections of pipe that are 2 inches or less in diameter.
- (d) “Domestic uses” means the use of water by any person, family unit or household or household purposes, the watering of livestock, poultry, farm and domestic animals used in operating a farm or the irrigation of lands not exceeding a total of two acres in area for the growing of gardens, orchards or lawns.

- (e) "Secretary" means the secretary of health and environment.
- (f) "Water well" means any excavation that is drilled, cored, bored, washed, driven, dug, jetted, or otherwise constructed, when the intended use of such excavation is for the location, diversion, artificial recharge, or acquisition of groundwater.
- (g) "Water well contractor" or "contractor" means any person who constructs, reconstructs or treats a water well. The term shall not include:
  - (1) An individual while in the act of constructing a water well on land which is owned by such individual and is used by such individual for domestic purposes at such individual's place of abode, but only when the well is constructed in compliance with prescribed minimum well standards as provided in this act; or
  - (2) an individual who performs labor or services for a licensed water well contractor at such contractor's direction and under such contractor's supervision.

History: L. 1973, ch. 417, § 3; L. 1974, ch. 352 § 172; L. 1989, ch. 311, § 1; July 1.

**82a-1205. Administration and enforcement of Kansas groundwater exploration and protection act; license fees; licenses; inspection; personnel; report.**

- (a) The secretary shall be responsible for the administration and enforcement of the provisions of this act and any rules and regulations adopted pursuant thereto.
- (b) The secretary shall fix by rules and regulations reasonable license fees annually for each contractor and for each drill rig operated by or for such contractor. The secretary shall fix by rules and regulations an additional fee for each water well drilled except as provided in paragraphs (1) and (2) of subsection (c) of K.S.A. 82a-1203 and amendments thereto. Such fees shall be in an amount, which, together with any other funds available therefor, will produce an amount, which will properly administer the provisions of this act. Any nonresident may secure a water well contractor's license in Kansas upon approval of an application therefor by the secretary and the payment of a fee equal to the fee charged for a similar nonresident license by the state in which the applicant is a resident, but in no case shall the fee be less than that charged a Kansas resident.

- (c) The secretary shall have the power and authority and may cause to be inspected water wells in all phases of construction, reconstruction, treatment or plugging, and shall have access to such wells at all reasonable times. The secretary shall have general supervision and authority over the construction, reconstruction and treatment of all water wells and the plugging of holes drilled and abandoned in search of a groundwater supply or hydrogeological information.
- (d) The secretary may employ within funds available such engineering, geological, legal, clerical and other personnel as may be necessary for the proper performance of responsibilities under this act. Such employees shall be within the classified service under the Kansas civil service act.
- (e) The secretary is authorized and directed to cause examination to be made of applicants for licensing; to renew such licenses; to adopt rules and regulations necessary to establish continuing education requirements for persons licensed under this act; to issue licenses to qualified water well contractors in this state; to revoke or suspend licenses after their issuance is hereafter determined, after notice to the person affected and an opportunity for hearing; and to reinstate licenses previously revoked when justification therefor is shown.
- (f) The secretary shall prepare, in the form and manner prescribed by law, a report on the administration of this act.

History: L. 1973, ch. 417, § 5; L. 1974, ch. 352, § 173; L. 1979, ch. 334, § 2; L. 1983, ch. 286, § 8; L. 1991, ch. 293, § 1; July 1.

**82a-1206.      Licensure of water well contractors; application fee; disposition of moneys; water well contractors licensing fund abolished; standards for granting license.**

- (a) Each well contractor desiring to engage in the business of constructing, reconstructing or treating water wells in this state shall make initial application for a license to the secretary. Every contractor making such application shall set out such information as may be required upon forms to be adopted and furnished by the secretary. The secretary shall charge an application fee as established by regulation for the filing of such initial application by a contractor, and the secretary shall not act upon any application until such application fee has been paid.

- (b) All application fees and license fees collected hereunder shall be remitted to the state treasurer at least monthly. Upon receipt of any such remittance, the state treasurer shall deposit the entire amount thereof in the state treasury and the same shall be credited to the state general fund. On July 1, 1983, the director of accounts and reports shall transfer all moneys in the water well contractors licensing to the state general fund. All liabilities of the water well contractors licensing fund are hereby transferred to and imposed upon the state general fund. The water well contractors licensing fund is hereby abolished.
- (c) A license to construct water wells shall be issued to any applicant if, under the standards set forth in K.S.A. 82a-1207 and amendments thereto, the secretary shall determine such applicant is qualified to conduct water well construction operations. In the granting of such licenses due regard shall be given to the interest of the state of Kansas in the protection of its underground water resources. Application fees paid hereunder shall be retained by the secretary whether such initial license is issued or denied, but if denied, the license fee shall be refunded.
- (d) Applicants for licenses hereunder who are engaged in business as water well contractors in this state, if incorporated, shall submit evidence of current good standing with the registration requirements for corporations of the secretary of state.

History: L. 1973, ch. 417, § 6; L. 1974, ch. 352, § 174, L. 1979, ch. 334, § 3; L. 1983, ch. 286, § 14; July 1.

**82a-1207. Investigation of qualifications; examination.** Under such reasonable rules and regulations as the secretary may adopt pertaining to the business of water well contracting and construction of water wells, the secretary shall investigate by examination or otherwise, the qualifications of all applicants for initial licenses as water well contractors to construct, reconstruct or treat wells for production of underground waters in this state. Where an examination is required, such examination may be oral or written or both. The qualifications required of each candidate for such an examination are as follows:

- (a) Familiarity with Kansas water laws, sanitary standards for water well drilling and construction of water wells and rules and regulations relating to water well construction, reconstruction, treatment and plugging as adopted by the secretary;
- (b) Knowledge of groundwater and subsurface geology in its relation to well construction.

The examinations conducted by the secretary shall be held at such times and places as he may determine. Failure of an applicant to pass such examination shall disqualify him from making further application for a period of one (1) month. The secretary shall act within a reasonable time upon all applications for licenses hereunder.

History: L. 1973, ch. 417, § 7; L. 1974, ch. 352, § 175; L. 1979, ch. 334, § 4; July 1.

**82a-1209. Terms of license; renewal; fees; revocation, when.** The term of all licenses issued under the provisions of this act shall be July 1 of each year through the following June 30.

Any contractor licensed under the provisions of this act may, on or before July 1, each year, renew such license by paying the annual fee as determined by the secretary and complying with continuing education requirements established by the secretary. If the licensee has not met the requirements for renewal of the license on or before July 1, the license shall be revoked by the secretary. Prior to such revocation, however, the secretary shall notify the applicant of the secretary's intention to revoke at least 10 days prior to the time set for action to be taken, by notice to the applicant at the address appearing on such license in the records and files of the secretary and compliance with the provision of the Kansas administrative procedure act. A license, once revoked, may not be reinstated unless the revocation resulted because of an error of the secretary or other reason not the fault of the licensee. A person whose license has been revoked and who desires to continue to engage in the business of water well construction in this state, must make application as provided for in K.S.A. 82a-1207, and amendments thereto. Such applicant may be required to retake the examination.

History: L. 1973, ch. 417, § 9; L. 1974, ch. 352, § 177; L. 1979, ch. 334, § 5; L. 1984, ch. 313, § 147; L. 1991, ch. 293, § 2; July 1.

**82a-1210. Revocation of license, when; complaints against licensee; notice and hearing. Any license issued under this act may be revoked by the secretary.**

- (1) when the licensee has practiced fraud or deceit in obtaining a license or otherwise engaging in activities regulated by this act;
- (2) for negligence or incompetence; or
- (3) for violating any requirement of this act.

Any person, in addition to the secretary, may make complaint against any licensee of the specific charges, in accordance with the notice provisions of the Kansas administrative procedure act. Prior to revocation or suspension of a license, the water well contractor shall be afforded the opportunity promptly to bring the well up to standard or to correct the error resulting in the complaint. Compliance must be acceptable to the secretary. The secretary shall not revoke any license pursuant to this section without giving the licensee an opportunity for hearing in accordance with the provisions of the Kansas administrative procedure act.

History: L. 1973, ch. 417, § 10; L. 1974, ch. 352, § 178; L. 1979, ch. 334, sec 6; L. 1984, ch. 313, § 148; July 1, 1985.

**82a-1211. Appeal from decisions of secretary.** Appeals from decisions of the secretary may be taken in accordance with the provisions of the act for judicial review and civil enforcement of agency actions.

History: L. 1973, ch. 417, § 11; L. 1974, ch. 352, § 179; L. 1984, ch. 313, § 149; July 1, 1985.

**82a-1212. Log of drilling, boring or digging; contents; filed with state geological survey.** Any water well contractor licensed under this act who constructs, reconstructs or plugs a water well shall keep a careful and accurate log of the construction, reconstruction or plugging of such well and shall furnish a record of said well log to the secretary within thirty (30) days after completion of such well in such form as the secretary might require. The log shall show:

- (a) The name and address of the landowner and the legal description of the well;
- (b) The character and depth of the formation passed through or encountered;
- (c) The depth at which water is encountered;
- (d) The static water level of the completed well;
- (e) A copy of the record of pumping test, if any; and
- (f) The construction or reconstruction details of the completed water well including lengths and sizes of casing, length and size of perforations or screens, and length and size of gravel packing; [and]

- (g) The amount, type and placement of plug materials used in plugging a water well.

A water sample shall be furnished to the secretary, upon request, within thirty (30) days after completion of such well unless an extension of time is granted by the secretary, in which case, the sample shall be furnished to the secretary within such extended period of time. The well logs and a copy of the water quality analysis shall be transmitted by the secretary to the state geological survey and kept on file by the survey and be available to the public.

History: L. 1973, ch. 417, § 12; L. 1974, ch. 352, § 180; L. 1979, ch. 334, § 7. July 1.

**82a-1213. Abandoned holes; plugging; failure to properly seal.** All holes drilled in search of a water supply and abandoned, shall be properly plugged by the drilling contractor in accordance with rules and regulations established by the secretary in order to assure adequate and proper plugging of abandoned wells to prevent pollution of existing groundwater. Any contractor who fails to properly seal any exploratory wells drilled in search of a water supply and abandoned by him or her shall be subject to the penalties set out in this act. All unplugged abandoned water wells shall be plugged or caused to be plugged by the landowner in accordance with rules and regulations established by the secretary in order to assure adequate and proper plugging of abandoned water wells to prevent pollution to existing groundwater supplies, except that no unplugged abandoned water well existing on the effective date of this act which is not polluting or threatening to pollute a groundwater supply shall be required to be plugged.

History: L. 1973, ch. 417, § 13; L. 1974, ch. 352, § 181; L. 1979, ch. 334, § 8; July 1.

**82a-1214. Penalty for violations of act; enforcement of act.** Any person who shall willfully violate any lawful rule or regulation of the secretary relating to water well contracting, or who shall engage in the business of constructing, reconstructing or treating water wells without first having obtained a license as in this act required, or who shall knowingly violate any provisions of this act, shall be guilty of a class B misdemeanor and subject to the penalties therefor as provided by law. In addition the secretary of health and environment is hereby authorized to apply to the district court for enforcement of this act or rules and regulations adopted under this act in accordance with the provisions of the act for judicial review and civil enforcement of agency actions.

History: L. 1973, ch. 417, § 14; L. 1974, ch. 352, § 182; L. 1979, ch. 335, § 1; L. 1984, ch. 313, § 150; July 1, 1985.

**82a-1215. Severability.** If any word, phrase, sentence or provision of this act is determined to be invalid, such invalidity shall not affect the other provisions of this act and they shall be given effect without the invalid provision, and to this end the provisions of this act are declared to be severable.

History: L. 1973, ch. 417, § 15; July 1.

**82a-1216. Civil penalties and orders; appeals; disposition of penalties.**

- (a) Any person who violates any provision of the Kansas groundwater exploration and protection act, any rules or regulations adopted thereunder or any order issued by the secretary thereunder shall incur in addition to other penalties provided by law, a civil penalty not to exceed \$5,000 for each violation. In the case of a continuing violation every day such violation continues shall be deemed a separate violation.
- (b) The secretary of the department of health and environment or the director of the division of environment, if designated by the secretary, upon a finding that a person has violated any provision of Kansas groundwater exploration and protection act, or any order issued or rule or regulation adopted thereunder, may:
  - (1) Issue a written order requiring that necessary remedial or preventive action be taken within a reasonable time period;
  - (2) assess a civil penalty for each violation within the limits provided in this section which shall constitute an actual and substantial economic deterrent to the violation for which is assessed; or
  - (3) both issue such order and assess such penalty. The order shall specify the provisions of the act or rules or regulations alleged to be violated and the facts constituting each violation. Such order shall include the right to a hearing. Any such order shall become final unless, within 15 days after service of the order, the person named therein shall request in writing a hearing by the secretary. If a hearing is requested, the secretary shall notify the alleged violator or violators of the date, place and time of the hearing.
- (c) No civil penalty shall be imposed under this section except after notification by issuance and service of the written order and hearing, if a hearing is requested, in accordance with the provisions of the Kansas administrative procedure act.
- (d) Any person aggrieved by an order of the secretary made under this section may appeal such order to the district court in the manner provided by the act for judicial review and civil enforcement of agency actions.

- (e) Any penalty recovered pursuant to the provisions of this section shall be remitted to the state treasurer, deposited in the state treasury and credited to the state general fund.
- (f) Nothing in this act shall be construed to abridge, limit or otherwise impair the right of any person to damages or other relief on account of injury to persons or property and to maintain any action or other appropriate proceeding therefor.

History: L. 1989, ch. 311, § 2; July 1.

**82a-1217. Restraining orders and injunctions; proof required.**

- (a) Notwithstanding the existence or pursuit of any other remedy, the secretary may maintain, in the manner provided by the act for judicial review and civil enforcement of agency actions, an action in the name of the state of Kansas for injunction or other process against any person to restrain or prevent any violation of the provision of the Kansas groundwater exploration and protection act or of any rules and regulations adopted thereunder.
- (b) In any civil action brought pursuant to this section in which a temporary restraining order, preliminary injunction or permanent injunction is sought, it shall be sufficient to show that a violation of the provisions of this act or the rules and regulation adopted thereunder has occurred or is imminent. It shall not be necessary to allege or prove at any stage of the proceeding that irreparable damage will occur should the temporary restraining order, preliminary injunction or permanent injunction not be issued or that the remedy at law is inadequate.

History: L. 1989, ch. 311, § 3; July 1.

**82a-1218. Application of penalties to sand and well point wells, exception.**

- (a) The provisions of K.S.A. 82a-1216 and 82a-1217 shall not apply with respect to any sand point or well point which is used for domestic purposes, or the reconstruction, replacement or treatment thereof, and which has not been abandoned, until the secretary adopts minimum standards for the construction, reconstruction, treatment and plugging of sand points or well points, except that a temporary restraining order, preliminary injunction or permanent injunction may be obtained pursuant to K.S.A. 82a-1217 if a health hazard is shown to exist or to be imminent.

History: L. 1989, ch. 311, § 4; July 1.

**82a-1219**      **Act supplemental to Kansas groundwater exploration and protection act.**  
K.S.A. 82a-1216, 82a-1217 and 82a-1218 shall be part of and supplemental to the  
Kansas groundwater exploration and protection act.

History: L. 1989, ch. 311, § 5; July 1.

STATE OF KANSAS  
DEPARTMENT OF HEALTH AND ENVIRONMENT

**ARTICLE 30**  
**WATER WELL CONTRACTOR'S LICENSE;**  
**WATER WELL CONSTRUCTION**

**EFFECTIVE SEPTEMBER 28, 1993**



Bureau of Water - Geology Section  
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**ARTICLE 30--WATER WELL CONTRACTOR'S LICENSE  
WATER WELL CONSTRUCTION AND ABANDONMENT**

This article regulates the construction, reconstruction, treatment and plugging of water wells and sets forth procedures for the licensing of water well contractors as required by K.S.A. 82a-1201 to 82a-1215 and amendments thereto.

**28-30-1.** (Authorized by K.S.A. 1979 Supp. 82a-1202, 82a-1205; effective E-74-34, July 02, 1974; modified, L. 1975, ch. 481, May 01, 1975; revoked May 01, 1980)

**28-30-2. Definitions.**

- (a) "License" means a document issued by the Kansas Department of Health and Environment to qualified persons making application therefore, authorizing such persons to engage in the business of water well contracting.
- (b) "Department" means the Kansas Department of Health and Environment.
- (c) "Abandoned Water Well" means a water well determined by the department to be a well;
  - (1) whose use has been permanently discontinued;
  - (2) in which pumping equipment has been permanently removed;
  - (3) which either is in such a state of disrepair that it cannot be used to supply water, or it has the potential for transmitting surface contaminants into the aquifer or both;
  - (4) which poses potential health and safety hazards; or
  - (5) which is in such a condition it cannot be placed in active or inactive status.
- (d) "Water well contractor" or "contractor" means any individual, firm, partnership, association, or corporation who constructs, reconstructs, or treats a water well. The term shall not include:
  - (1) an individual constructing, reconstructing or treating a water well located on land owned by the individual, when the well is used by the individual for farming, ranching, or agricultural purposes or for domestic purposes at the individual's place of abode; or

- (2) an individual who performs labor or services for a licensed water well contractor at the contractor's direction and under the contractor's supervision.
- (e) "Aquifer" means an underground formation that contains and is capable of transmitting groundwater.
- (f) "Confined aquifer" is an aquifer overlain and underlain by impermeable layers. Groundwater in a confined aquifer is under pressure greater than atmospheric pressure and will rise in a well above the point at which it is first encountered.
- (g) "Unconfined aquifer" is an aquifer containing groundwater at atmospheric pressure. The upper surface of the groundwater in an unconfined aquifer is the water table.
- (h) "Domestic uses" means the use of water by any person or family unit or household for household purposes, or for the watering of livestock, poultry, farm and domestic animals used in operating a farm, or for the irrigation of lands not exceeding a total of two acres in area for the growing of gardens, orchards and lawns.
- (i) "Public water-supply well" means a well that:
  - (1) provides groundwater to the public for human consumption; and
  - (2) has at least 10 service connections or serves an average of at least 25 individuals daily at least 60 days out of the year.
- (j) "Groundwater" means the part of the subsurface water which is in the zone of saturation.
- (k) "Grout" means cement grout, neat cement grout, bentonite clay grout or other material approved by the department used to create a permanent impervious watertight bond between the casing and the undisturbed formation surrounding the casing or between two or more strings of casing.
  - (1) "Neat cement grout" means a mixture consisting of one 94 pound bag of portland cement to five to six gallons of clean water.

- (2) “Cement grout” means a mixture consisting of one 94 pound bag of portland cement to an equal volume of sand having a diameter no larger than 0.080 inches (2 millimeters) to five to six gallons of clean water.
- (3) “Bentonite clay grout” means a mixture consisting of water and commercial grouting or plugging sodium bentonite clay containing high solids such as that manufactured under the trade name of “volclay grout”, or an equivalent as approved by the department.
  - (A) The mixture shall be as per the manufacturer’s recommendations to achieve a weight of not less than 9.4 pounds per gallon of mix. Weighting agents may be added as per the manufacturer’s recommendations.
  - (B) Sodium bentonite pellets, tablets or granular sodium bentonite may also be used provided they meet the specifications listed in paragraph (k)(3) of this regulation.
  - (C) Sodium bentonite products that contain low solids, are designed for drilling purposes, or that contain organic polymers shall not be used.
- (l) “Pitless well adapter or unit” means an assembly of parts installed below the frost line which will permit pumped groundwater to pass through the wall of the casing or extension thereof and prevent entrance of contaminants.
- (m) “Test hole” or “hole” means any excavation constructed for the purpose of determining the geologic, hydrologic and water quality characteristics of underground formations.
- (n) “Static water level” means the highest point below or above ground level which the groundwater in the well reaches naturally.
- (o) “Annular space” means the space between the well casing and the well bore or the space between two or more strings of well casing.
- (p) “Sanitary well seal” is a manufactured seal installed at the top of the well casing which, when installed, creates an airtight and watertight seal to prevent contaminated or polluted water from gaining access to the groundwater supply.

- (q) “Treatment” means the stimulation of production of groundwater from a water well, through the use of hydrochloric acid, muratic acid, sulfamic acid, calcium or sodium hypochlorite, polyphosphates or other chemicals and mechanical means, for the purpose of reducing or removing iron and manganese hydroxide and oxide deposits, calcium and magnesium carbonate deposits and slime deposits associated with iron or manganese bacterial growths which inhibit the movement of groundwater into the well.
- (r) “Reconstructed water well” means an existing well that has been deepened or has had the casing replaced, repaired, added to or modified in any way for the purpose of obtaining groundwater.
- (s) “Pump pit” means a watertight structure which:
  - (1) is constructed at least two feet away from the water well and below ground level to prevent freezing of pumped groundwater; and
  - (2) houses the pump or pressure tank, distribution lines, electrical controls, or other appurtenances.
- (t) “Grout tremie pipe” or “grout pipe” means a steel or galvanized steel pipe or similar pipe having equivalent structural soundness that is used to pump grout to a point of selected emplacement during the grouting of a well casing or plugging of an abandoned well or test hole.
- (u) “Uncased test hole” means any test hole in which casing has been removed or in which casing has not been installed.
- (v) “Drilling rig registration license number” means a number assigned by the department which is affixed to each drilling rig operated by or for a licensed water well contractor.
- (w) “Active well” means a water well which is an operating well used to withdraw water, or to monitor or observe groundwater conditions.
- (x) “Inactive status” means a water well which is not presently operating but is maintained in such a way it can be put back in operation with a minimum of effort.

- (y) “Heat pump hole” means a hole drilled to install piping for an earth coupled water source heat pump system, also known as a vertical closed loop system. (Authorized by K.S.A. 1992 Supp. 82a-1205 and implementing K.S.A. 82a-1202, K.S.A. 1992 Supp. 82a-1205, 82a-1213; effective E-74-34, July 02, 1974; modified L. 1975, ch. 481, May 01, 1975; amended May 01, 1980; amended May 01, 1987; amended Nov. 22, 1993.)

**28-30-3. Licensing.**

- (a) Eligibility. To be eligible for a water well contractor’s license and applicant shall:
  - (1) pass an examination conducted by the department; or
  - (2) meet the conditions contained in subsection (c).
- (b) Application and fees.
  - (1) Each application shall be accompanied by an application fee of \$10.00.
  - (2) Before issuance of a water well contractor’s license, each contractor shall pay a license fee of \$100.00 plus \$25.00 for each drill rig operated by or for the contractor. These fees shall accompany the application and shall be by bank draft, check or money order, payable to the Kansas Department of Health and Environment - Water Well Licensure.
- (c) Reciprocity.
  - (1) Upon receipt of an application and payment of the required fees from a nonresident, the secretary may issue a license, providing the nonresident holds a valid license from another state and meets the minimum requirements for licensing as prescribed in K.S.A. 82a-1207, and any amendments thereto.
  - (2) If the nonresident application is incorporated, evidence shall be submitted to the Department of Health and Environment showing that the applicant meets the registration requirements of the Kansas Secretary of State.

- (3) Nonresident fees for a license shall be equal to the fee charged a Kansas contractor by the applicant's state of residence but shall not be less than \$100.00. The application fee and drill rig license fee shall be the same as the Kansas resident fees.
- (d) License renewal.
  - (1) Each licensee shall make application for renewal of license and rig registrations before July 01 of each year by filing the proper renewal forms provided by the department and fulfilling the following requirements:
    - (A) payment of the annual license fee and a rig registration fee for each drill rig to be operated in the state;
    - (B) filing of all well records for each water well constructed, reconstructed or plugged by the licensee in accordance with K.S.A. 28-30-4 during the previous licensure period;
    - (C) filing a report, on a form provided by the department, of all approved continuing education units earned by the licensee during the previous licensure period;
    - (D) satisfying the continuing education requirements set forth in subsection (g); and
    - (E) providing any remaining outstanding information or records requested that existed prior to the issuance of revocation of a license.
  - (2) Failure to comply with paragraphs (A), (B), (C), (D) and (E) above shall be grounds to revoke the existing license and terminate the license renewal process.
- (e) Water well construction fee. A fee of \$5.00 shall be paid to the Kansas Department of Health and Environment, either by bank draft, check or money order, for each water well constructed by a licensed water well contractor. The construction fee shall be paid when the contractor requests the water well record form WWC-5 from the department or shall accompany the water well records submitted on form WWC-5 as required under K.A.R. 28-30-4. No fee shall be required for reconstruction or plugged water wells.

- (f) License number. Each drill rig operated by or for a licensed water well contractor shall have prominently displayed thereon the drill rig license number, as assigned by the department, in letters at least two inches in height. Decals, paint, or other permanent marking materials shall be used.
- (g) Continuing education requirements. Licensed water well contractors shall earn at least eight units of approved continuing education per year beginning with the first full year of licensure or the renewal period. One unit of continuing education shall equal 50 minutes of approved instruction except for trade shows and exhibitions which shall be counted as one unit per approved trade show and exhibition attended. (Authorized by K.S.A. 1992 Supp. 82a-1205; implementing K.S.A. 82a-1202, K.S.A. 1992 Supp. 82a-1205, 82a-1206, 82a-1207, 82a-1209; effective, E-74-34, July 02, 1974; effective May 01, 1975; amended May 01, 1980; amended May 01, 1983; amended May 01, 1987; amended Nov. 22, 1993.)

**28-30-4. General operating requirements.**

- (a) *Water well record.* Within 30 days after construction or reconstruction of a water well, the water well contractor shall submit a report of such work, to the Kansas Department of Health and Environment and the landowner, on the water well record form, form WWC-5, provided by the department. The contractor shall report to the department and to the landowner on the water well record or attachments made thereto any polluted or other noncompliant conditions which the contractor was able to correct and any conditions which the contractor was unable to correct. The contractor shall report to the department and the landowner the plugging of any abandoned water well. The report shall include the location, landowner's name, method, type of material, its placement and amount used to plug the abandoned water well.

A landowner who constructs, reconstructs, or plugs a water well, which will be or was, used by the landowner for farming, ranching or agricultural purposes or is located at the landowner's place of abode, shall submit a water well record, on Form WWC-5, of such work to the department within 30 days after the construction, reconstruction or plugging of the water well. No fee shall be required from the landowner for the record.

- (b) *Artificial recharge and return.* The construction of artificial recharge wells and freshwater return wells shall comply with all applicable rules and regulations of the department.

- (c) *Well tests.* When a pumping test is run on a well, results of the test shall be reported on the water well record, form WWC-5, or a copy of the contractor's record of the pumping test shall be attached to the water well record.
- (d) *Water samples.* Within 30 days after receipt of the water well record, form WWC-5, the department may request the contractor, or landowner who constructs or reconstructs his or her own water well, to submit a sample of water from the well for chemical analysis. Insofar as is possible, the department will define in advance areas from which well water samples are required. (Authorized by K.S.A. 82a-1205, and implementing K.S.A. 82a-1202, 82a-1205, 82a-1212, 82a-1213; effective, E-74-34, July 02, 1974; modified, L. 1975, ch. 481, May 01, 1975; amended May 01, 1980; amended May 01, 1987.)

**28-30-5. Construction regulations for public water supply and reservoir sanitation zone wells.** All activities involving public water supply wells and wells located in reservoir sanitation zones shall conform to existing statutes, and rules and regulations, of the Kansas Department of Health and Environment, including K.A.R. 28-10-100, 28-10-101, 28-15-16. (Authorized by K.S.A. 82a-1205; implementing K.S.A. 82a-1202, 82a-1205; effective, E-74-34, July 02, 1974; effective May 01, 1975; amended May 01, 1980; amended May 01, 1983; amended May 01, 1987.)

**28-30-6 Construction regulations for all wells not included under section 28-30-5.**

- (a) each water well shall be so located as to minimize the potential for contamination of the delivered or obtained groundwater and to protect the groundwater aquifers from pollution and contamination.
- (b) Grouting:
  - (1) Construction or reconstructed wells shall be sealed by grouting the annular space between the casing and the well bore from ground level to a minimum of 20 feet or to a minimum of five feet into the first clay or shale layer, if one is present, whichever is greater. If a pitless well adapter or unit is being installed, the grouting shall start below the junction of the pitless well adapter or unit where it attaches to the well casing and shall continue a minimum of 20 feet below this point, or to a minimum of five feet into the first clay or shale layer, whichever is greater.

- (2) To facilitate grouting, the grouted interval of the well bore shall be drilled to a minimum diameter at least three inches greater than the maximum outside diameter of the well casing. If a pitless well adapter or unit is being installed on the well's casing, the well bore shall be a minimum diameter of at least three inches greater than the outside maximum diameter of the well casing through the grouted interval below the point where the pitless well adapter or unit attaches to the well casing.
- (c) If groundwater is encountered at a depth less than the minimum grouting requirement, the grouting requirement may be modified to meet local conditions if approved by the department.
- (d) Waters from two or more separate aquifers shall be separated from each other in the bore hole by sealing the bore hole between the aquifers with grout.
- (e) The well casing shall terminate not less than one foot above the finishing ground surface. No casing shall be cut off below the ground surface except to install a pitless well adapter unit, which shall extend at least 12 inches above the ground surface. No opening shall be made through the well casing except for installation of a pitless well adapter designed and fabricated to prevent soil, subsurface and surface water from entering the well.
- (f) Well vents shall be used and shall terminate not less than one foot above the ground surface and shall be screened with brass, bronze, copper screen or other screen materials approved by the department which are 16-mesh or greater and turned down in a full 180 degree return bend so as to prevent the entrance of contaminated materials.
- (g) Prior to completion of a constructed or reconstructed well, the well shall be cleaned of mud, drill cuttings and other foreign matter so as to make it suitable for pump installations.
- (h) Casing. All wells shall have durable watertight casing from at least one foot above the finished ground surface to the top of the producing zone of the aquifer. The watertight casing shall extend not less than 20 feet below the ground level. Exceptions to either of the above requirements may be granted by the department if warranted by local conditions. The casing shall be cleaned and serviceable and of a type to guarantee reasonable life so as to insure adequate protection to the aquifer or aquifers supplying the groundwaters. Used, reclaimed, rejected,

or contaminated pipe shall not be used for casing any well. All water well casing shall be approved by the department.

- (i) All wells, when unattended during construction, reconstruction, treatment or repair, or during use as cased test holes, observation or monitoring wells, shall have the top of the well casing securely capped in a watertight manner to prevent contaminating or polluting materials from gaining access to the groundwater aquifer.
- (j) During construction, reconstruction, treatment or repair and prior to its first use, all wells producing water for human consumption or food processing, shall be disinfected according to K.A.R. 28-30-10.
- (k) The top of the well casing shall be sealed by installing a sanitary well seal.
- (l) All groundwater producing zones that are known or suspected to contain natural or manmade pollutants shall be adequately cased and grouted off during construction of the well to prevent the movement of the polluted groundwater to either overlying or underlying fresh groundwater zones.
- (m) Toxic materials shall not be used in the construction, reconstruction, treatment or plugging of a water well unless those materials are thoroughly flushed from the well prior to use.
- (n) Any pump pit shall be constructed at least two feet away from the water well. The pipe from the pump or pressure tank in the pump pit to the water well shall be sealed in a watertight manner where it passes through the wall of the pump pit.
- (o) Water wells shall not be constructed in pits, basements, garages, or crawl spaces. Existing water wells which are reconstructed, abandoned and plugged in basements shall conform to these rules and regulations except that the finished grade of the basement floor shall be considered ground level.
- (p) All drilling waters used during the construction or reconstruction of any water well shall be initially disinfected by mixing with the water enough sodium hypochlorite to produce at least 100 milligrams per liter, mg/l, of available chlorine.

- (q) Natural organic or nutrient producing material shall not be used during the construction, reconstruction or treatment of a well unless it is thoroughly flushed from the well and the groundwater aquifer or aquifers before the well is completed. Natural organic or nutrient producing material shall not be added to a grout mix used to grout the well's annular space.
- (r) Pump mounting.
  - (1) All pumps installed directly over the well casing shall be so installed that an airtight and watertight seal is made between the top of the well casing and the gear or pump head, pump foundation or pump stand.
  - (2) When the pump is not mounted directly over the well casing and the pump column pipe or pump suction pipe emerges from the top of the well casing, a sanitary well seal shall be installed between the pump column pipe and pump suction pipe and the well casing. An airtight and watertight seal shall be provided for the cable conduit when submersible pumps are used.
- (s) Construction of sand point or well point water wells. Sand point or well point water wells shall be constructed by drilling or boring a pilot hole to a minimum depth of three feet below ground surface. The pilot hole shall be a minimum of three inches greater in diameter than the drive pipe or point wells shall only be completed by using the casing method or the drive pipe method as described in paragraphs (1) and (2) below or other methods as described in paragraph (3) below. Sand point wells constructed prior to the effective date of this regulation shall not be required to meet these requirements. All sand point wells that are replaced, constructed, reconstructed or plugged after the effective date of this regulation shall meet these regulations.
  - (1) Casing method. Approved, durable, watertight well casing shall be set from a minimum of three feet below the ground surface to at least one foot above the ground surface. The casing shall be sealed between the casing and the pilot hole with approved grouting material from the bottom of the casing to ground surface. The drive pipe shall be considered the pump drop pipe. For underground discharge completions, a "T" joint shall be used. The drive pipe shall be capped with a solid cap at the "T" joint when the casing method is used. An approved sanitary well seal and a well vent shall be installed on the top of the well casing in accordance with K.A.R. 28-30-6 (f) and (k).

- (2) Drive pipe method. Sand point wells may be installed without a casing for above ground discharge completions only. In such completions, the drive pipe shall terminate at least one foot above finished ground level. The annular space between the drive pipe and the pilot hole shall be sealed with approved grouting material from the bottom of the pilot hole to ground surface. The top of the drive pipe shall be sealed airtight and watertight with a solid cap of the same material as the drive pipe. A well vent shall not be required for the drive pipe method.
- (3) Other methods. Other methods may be specifically approved by the department on a case-by-case basis by using the appeal procedure included in K.A.R. 28-30-9.
- (4) Abandonment of sand point wells. Upon abandonment of a sand point well, the contractor or landowner shall either pull the drive pipe or leave it in place. If the drive pipe is left in place, the sand point well shall be plugged from the bottom of the well to three feet below the ground surface with approved grouting material. The drive pipe well shall be cut off three feet below the ground surface and the remaining three foot deep hole shall be backfilled with surface soil.

If the drive pipe is completely pulled, the remaining hole shall be plugged with approved grouting material from the bottom of the remaining hole to three feet below the ground surface. The hole shall be backfilled with surface soil from 3 feet to ground surface. (Authorized by K.S.A. 1991 Supp. 82a-1205; implementing K.S.A. 82a-1202, K.S.A. 1991 Supp. 82a-1205; effective, E-74-34, July 02, 1974; modified, L. 1975, ch. 481, May 01, 1975; amended May 01, 1980; amended May 01, 1983; amended May 01, 1987; amended June 21, 1993.)

**28-30-7. Plugging of abandoned wells, cased and uncased test holes.**

- (a) All water wells abandoned by the landowner on or after July 01, 1979, and all water wells that were abandoned prior to July 01, 1979 which pose a threat to groundwater supplies, shall be plugged or caused to be plugged by the landowner. In all cases, the landowner shall perform the following as minimum requirements for plugging abandoned wells.
  - (1) The casing shall be cut off three feet below ground surface and removed.

- (2) All wells shall be plugged from bottom to top using volumes of material equaling at least the inside volume of the well.
- (3) Plugging top of well:
  - (A) For cased wells a grout plug shall be placed from six to three feet below ground surface.
  - (B) For dug wells, the lining material shall be removed to at least five feet below ground surface, and then sealed at five feet with a minimum of six inches of concrete or other materials approved by the department. Compacted surface silts and clays shall be placed over the concrete seal to ground surface.
- (4) Any groundwater displaced upward inside the well casing during the plugging operation shall be removed before additional plugging materials are added.
- (5) From three feet below ground level to ground level, the plugged well shall be covered over with compacted surface silts or clays.
- (6) Compacted clays or grout shall be used to plug all wells from the static water level to six feet below surface.
- (7) All sand and gravel used in plugging abandoned domestic or public water supply wells shall be chlorinated prior to placement into a well.
- (b) Abandoned wells formerly producing groundwater from an unconfined aquifer shall be plugged in accordance with the foregoing and in addition shall have washed sand, and gravel or other material approved by the department placed from the bottom of the well to the static water level.
- (c) Abandoned wells, formerly producing groundwater from confined and unconfined aquifers or in confined aquifers only, shall be plugged according to K.A.R. 28-30-7(a) and by using one of the following additional procedures:
  - (1) The entire well column shall be filled with grout, or other material approved by the department, by use of a grout tremie pipe.

- (2) A 10 foot grout plug shall be placed opposite the impervious formation or confining layer above each confined aquifer or aquifers by use of a grout tremie pipe; and
  - (A) The space between plugs shall be filled with clays, silts, sand and gravel or grout and shall be placed inside the well so as to prevent bridging.
  - (B) A grout plug at least 20 feet in length shall be placed with a grout pipe so at least 10 feet of the plug extends below the base of the well casing and at least 10 feet of the plug extends upward inside the bottom of the well casing.
  - (C) A grout plug at least ten feet in length shall be placed from at least 13 feet below ground level to the top of the cut off casing.
- (3) Wells that have an open bore hole below the well casing, and where the casing was not grouted into the well bore when the well was constructed, shall be plugged by (1) or (2) above, except that the top 20 feet of well casing shall be removed or perforated with the casing ripper or similar device prior to plugging. If the well is plugged according to part (2) of this subsection, the screened or perforated intervals below the well casing shall be grouted the entire length by use of a grout tremie pipe.
- (d) Plugging of abandoned holes. If the hole penetrates an aquifer containing water with more than 1,000 milligrams per liter, mg/l, total dissolved solids or is in an area determined by the department to be contaminated, the entire hole shall be plugged with an approved grouting material from the bottom of the hole, up to within three feet of the ground surface using a grout tremie pipe or similar method. From three feet below ground surface to ground surface the plugged hole shall be covered over with compacted surface silts or clays; otherwise, the hole shall be plugged in accordance with the following paragraphs.
  - (1) Plugging of abandoned cased test holes. The casing shall be removed if possible and the abandoned test hole shall be plugged with an approved grouting material from the bottom of the hole, up to within three feet of the ground surface, using a grout tremie pipe or similar method. From three feet below ground surface to ground surface the plugged hole shall be covered over with compacted surface silts or clays.

If the casing cannot be removed, in addition to plugging the hole with an approved grouting material the annular space shall also be grouted as described in K.A.R. 28-30-6 or as approved by the department.

- (2) Abandoned uncased test holes, exploratory holes or any bore holes except seismic or oil field related exploratory and services holes regulated by the Kansas Corporation Commission under K.A.R. 82-3-115 through 82-3-117. A test hole or bore hole drilled, bored, cored or augered shall be considered an abandoned hole immediately after the completion of all testing, sampling or other operations for which the hole was originally intended. The agency or contractor in charge of the exploratory or other operations for which the hole was originally intended is responsible for plugging the abandoned hole using the following applicable method, within three calendar days after the termination of testing other operations.
  - (A) The entire hole shall be plugged with an approved grouting material from bottom of the hole, up to within three feet of the ground surface, using a grout tremie pipe or similar method.
  - (B) From three feet below ground surface to ground surface the plugged hole shall be covered over with compacted surface silts or clays.
  - (C) For bore holes of 25 feet or less, drill cuttings from the original hole may be used to plug the hole in lieu of grouting material, provided that an aquifer is not penetrated or the bore hole is not drilled in an area determined by the department to be a contaminated area.
- (3) Plugging of heat pump holes drilled for closed loop heat pump systems. The entire hole shall be plugged with an approved grouting material from bottom of the hole, to the bottom of the horizontal trench, using a grout tremie pipe or similar method approved by the department.

- (e) Abandoned oil field water supply wells. A water well drilled at an oil or gas drilling site to supply water for drilling activities shall be considered an abandoned well immediately after the termination of the oil or gas drilling operations. The company in charge of the drilling of the oil or gas well shall be responsible for plugging the abandoned water well, in accordance with K.A.R. 28-30-7(a), (b), and (c), within 30 calendar days after the termination of oil and gas drilling operations.

Responsibility for the water well may be conveyed back to the landowner in lieu of abandoning and plugging the well but the well must conform to the requirements for active or inactive status. The transfer must be made through a legal document, approved by the department, advising the landowner of the landowner's responsibilities and obligations to properly maintain the well, including the proper plugging of the well when it is abandoned and no longer needed for water production activities. If a transfer is to be made, the oil or gas drilling company shall provide the department with a copy of the transfer document within 30 calendar days after the termination of oil or gas drilling operations. Within 30 calendar days of the effective date of the transfer of the well the landowner shall notify the department of the intended use and whether the well is in active status or inactive status in accordance with K.A.R. 28-30-7(f).

- (f) Inactive status. Landowners may obtain the department's written approval to maintain wells in an inactive status rather than being plugged if the landowner can present evidence to the department as to the condition of the well and as to the landowner's intentions to use the well in the future. As evidence of intentions, the owner shall be responsible for properly maintaining the well in such a way that:
  - (1) The well and the annular space between the hole and the casing shall have no defects that will permit the entrance of surface water or vertical movement of subsurface water into the well;
  - (2) the well is clearly marked and is not a safety hazard;
  - (3) the top of the well is securely capped in a watertight manner and is adequately maintained in such a manner as to prevent easy entry by other than the landowner;
  - (4) the area surrounding the well shall be protected from any potential sources of contamination within a 50 foot radius;

- (5) if the pump, motor or both, have been removed for repair, replacement, etc., the well shall be maintained to prevent injury to people and to prevent the entrance of any contaminant or other foreign material;
- (6) the well shall not be used for disposal or injection of trash, garbage, sewage, wastewater or storm runoff; and
- (7) the well shall be easily accessible to routine maintenance and periodic inspection.

The landowner shall notify the department of any change in the status of the well. All inactive wells found not to be in accordance with the criteria listed in lines one through seven above shall be considered to be abandoned and shall be plugged by the landowner in accordance with K.A.R. 28-30-7(a) through (c). (Authorized by K.S.A. 82a-1205; implementing K.S.A. 82a-1202, 82a-1205, 82a-1212, 82a-1213; effective, E-74-34, July 02, 1974; modified, L. 1975, ch. 481, May 01, 1975; amended May 01, 1980; amended May 01, 1983; amended May 01, 1987.)

**28-30-8. Pollution sources.** Well locations shall be approved by municipal and county governments with respect to distances from pollution sources and compliance with local regulations. The following minimum standard shall be observed.

- (a) The horizontal distances between the well and the potential source of pollution or contamination such as sewer lines, pressure sewer lines, septic tanks, lateral fields, pit privy, seepage pits, fuel or fertilizer storage, pesticide storage, feed lots or barn yards shall be 50 feet or more as determined by the department.
- (b) Proper drainage in the vicinity of the well shall be provided so as to prevent the accumulation and ponding of surface water within 50 feet of the well. The well shall not be located in a ravine or any other drainage area where surface water may flow into the well.
- (c) When sewer lines are constructed of cast iron, plastic or other equally tight materials, the separation distance shall be 10 feet or more as determined by the department.

- (d) All wells shall be 25 feet or more from the nearest property line, allowing public right-of-ways to be counted; however, a well used only for irrigation or cooling purposes may be located closer than 25 feet to an adjoining property where:
  - (1) such adjoining property is serviced by a sanitary sewer and does not contain a septic tank system, disposal well or other source of contamination or pollution; and
  - (2) the property to be provided with the proposed well is served by both a sanitary sewer and a public water supply. (Authorized by and implementing K.S.A. 82a-1202, 82a-1205; effective, E-74-34, July 02, 1974; modified, L. 1975, ch. 481, May 01, 1975; amended May 01, 1980; amended May 01, 1987.)

**28-30-9. Appeals.**

- (a) Requests for exception to any of the foregoing rules and regulations shall be submitted to the department in writing and shall contain all information relevant to the request.
  - (1) Those requests shall specifically set forth why such exception should be considered.
  - (2) The department may grant exceptions when geologic or hydrologic conditions warrant an exception and when such an exception is in keeping with the purposes of the Kansas groundwater exploration and protection act.
- (b) Appeals from the decision of the department shall be made to the secretary, who after due consideration may affirm, reverse or modify the decision of the department. (Authorized by K.S.A. 82a-1205; implementing K.S.A. 82a-1202, 82a-1205; effective, E-74-34, July 02, 1974; effective May 01, 1975; amended May 01, 1980; amended May 01, 1983; amended May 01, 1987.)

**28-3-10 Water well disinfection for wells constructed or reconstructed for human consumption or food processing.**

- (a) Gravel for gravel-packed wells shall be disinfected by immersing the gravel in a chlorine solution containing not less than 200 milligrams per liter, mg/l, of available chlorine before it is placed in the wells annular space.

- (b) Constructed or reconstructed wells shall be disinfected by adding sufficient hypochlorite solution to them to produce a concentration of not less than 100 mg/l of available chlorine when mixed with the water in the well.
- (c) The pump, casing, screen and pump column shall be washed down with a 200 mg/l available chlorine solution.
- (d) All persons constructing, reconstructing, or treating, a water well and removing the pump or pump column, replacing a pump, or otherwise performing an activity which has potential for contaminating or polluting the groundwater supply shall be responsible for adequate disinfection of the well, well system and appurtenances thereto. (Authorized by and implementing K.S.A. 82a-1202, 82a-1205; effective, E-74-34, July 02, 1974; modified, L. 1975, ch. 481, May 01, 1975; amended May 01, 1980; amended May 01, 1987.)

Effective May 01, 1980

Kansas Department of Health and Environment  
Approved Water Well Casing  
(Authorization K.A.R. 28-30-6(h))

Water Well Casing for Water Wells Other Than Public  
Water Supply and Reservoir Sanitation Zone Water Wells

**STEEL AND WROUGHT IRON**

Dept of Casing in Feet	Nominal Diameter, (in inches)									
	04	06	08	10	12	14	16	18	24	30
	Minimum Wall Thickness*									
0-100	10	10	10	10	10	10	10	10	7	.219
100-200	10	10	10	10	10	7	7	7	.219	.219
200-400	10	10	10	10	7	7	7	.219	.250	.250
400-600	7	7	7	7	7	7	.219	.250	.312	.312
600 +	7	.219	.219	.219	.219	.219	.250	.375	.375	.375

\*Decimal numbers indicate thickness in inches. Whole numbers indicate the United States standard gage (10 gage=0.141 inches and 7 gage=.0179 inches.)

Kansas Department of Health and Environment  
Approved Water Well Casing  
(Authorization K.A.R. 28-30-6(h))

Water Well Casing for Water Wells Other Than Public  
Water Supply and Reservoir Sanitation Zone Water Wells

**THERMAL PLASTIC WATER WELL CASING**

For Polyvinyl Chloride (PVC), Styrene Rubber (SR)  
which is the same as Rubber Modified Polystyrene (RMP)  
and Acrylonitrile - Butadiene Styrene (ABS)

Minimum Wall Thickness (inches) and Tolerances (inches) made in  
Standard Dimension Ratios (SDR)

Normal Pipe Size	SDR 26		SDR 21		SDR 17		SDR 13.5	
	Min.	Tol.	Min.	Tol.	Min.	Tol.	Min.	Tol.
2	-----	-----	0.113	0.020	0.140	0.020	0.176	0.021
2.5	-----	-----	0.137	0.020	0.169	0.020	0.213	0.026
3	-----	-----	0.167	0.020	0.206	0.025	0.259	0.031
3.5	-----	-----	0.190	0.023	0.235	0.028	0.296	0.036
4	0.173	0.021	0.214	0.026	0.265	0.032	0.333	0.040
5	0.214	0.027	0.265	0.032	0.327	0.039	0.412	0.049
6	0.255	0.031	0.316	0.038	0.390	0.047	0.491	0.058
8	0.332	0.040	0.410	0.049	0.508	0.061	-----	-----
10	0.413	0.050	0.511	0.061	0.632	0.076	-----	-----
12	0.490	0.059	0.060	0.073	0.750	0.090	-----	-----
14	0.539	0.065						
16	0.616	0.074						

The minimum is the lowest wall thickness of the wall casing pipe at any cross section. All tolerances are on the plus side of the minimum requirement.

**State of Kansas**

**CONSTRUCTING GUIDELINES FOR CLOSED LOOP HEAT PUMP WELL**

**(1) Casing Material.** Permanent casing is needed in a heat pump well, it must meet standards set out by ASTM and the plastic must be grouted full-length of the bore hole.

**(A) High Density**

**Polyethylene Pipe.** This pipe must be manufactured in accordance with dimensional specifications of ASTM D-2513 or ASTM F-714 and have a minimum cell classification of PR 345434C or PE 355434C when tested under ASTM D-3350 to be acceptable for use in closed-loop heat pump systems.

**(B) Polyethylene Pipe.**

This pipe must be manufactured in accordance with ASTM D-2581. The pipe must be -

1. Either Class B (general purpose and dielectric, in colors) or Class C (weather resistance, black in color containing not less than (2%) carbon black);
2. Type II (density, ninety-one thousands to ninety-two (.0091 - .0092) grams per centimeter (g/cm);
3. Grade 1. (flow rate twenty-five thousands to seventy-five thousands (.0025 - .0075) gallons per ten (10) minutes (g/10 min).

**(2) Connecting Closed-Loop Pipe.**

Polyethylene and polybutylene pipe must be thermally fused according to the pipe manufacture's specifications and must not leak after assembly.

**(3) Heat Transfer Fluid.**

The fluid used inside the closed-loop assembly must be approved by the department and meet the following standards:

**(A) Heat transfer fluids must be composed of-**

1. Pure glycerine solutions-glycerine must be ninety-six and one-half percent (96.5%) United States pharmacopeia grade;
2. Food grade propylene glycol;
3. Dipotassium phosphate;

4. Sodium Chloride;
5. Potassium acetate;
6. Methanol;
7. Ethanol; or
8. Other fluids may be used if approved by the department is received in advanced with appropriate documentation.

**(B)** The fluid as it is used in a diluted state in the closed-loop must have the following properties:

1. Be ninety percent(90%) biodegradable;
2. Demonstrate low corrosion to all materials common to ground source heat pump systems;
3. Have a freezing point that exceeds minus twenty three degrees Celsius (-23°C);
4. Be homogenous, uniform in color, free from lumps, skins and foreign material would be detrimental to the fluid usage;
5. Not have a flash point lower than ninety degrees Celsius (90°C);
6. Not have a five (5)-day biological demand (BOD) at ten degrees Celsius (10°C) that exceeds more than two-tenths (0.2) gram oxygen per gram nor be less than one-tenth (0.1) gram per gram;
7. Not have a toxicity that is less than lethal dose (LD) fifty (50) oral-rats of (5) grams per kilograms; and
8. Show neither separation from exposure to heat or cold, nor show an increase in turbidity; and

**(C)** While this rule attempts to define antifreeze fluids that will protect the environment, it is the responsibility of the driller to become familiar with safe and proper use of these fluids and to take proper use of these fluids and to take necessary precautions to ensure groundwater protection.

#### **(4) Hole Size.**

The hole size for heat pump wells that are grouted full-length with high solids bentonite slurry must be of sufficient size to allow placement of a tremie pipe to emplace the high solids bentonite slurry. The slurry must fill the hole and surround all pipes. There must be at least one-half inch ( $\frac{1}{2}$ " ) between the hole and all pipes. If full length high solids bentonite slurry is not used, then the following hole sizes are required.

(A) At least a five inch (5") borehole when the loop pipe is less than one inch (1") in diameter.

(B) At least a six inch (6") borehole when the loop is one and a quarter inch ( $1\frac{1}{4}$ " ) or greater in diameter;

#### **(5) Hole Depth.**

Closed-loop heat pump wells have no limit as to how far the well bore can be drilled however all formations that are encountered that penetrates an aquifer containing water with more than 1,000 milligrams per liter, (mg/l), total dissolved solids or is in an area determined by the department to be contaminated, the entire hole shall be plugged with an approved cement grout. **A note shall be placed on the WWC-5 well log stating what type of contamination was encountered.**

#### **6) Heat Pump System Design.**

The heat pump system that utilizes wells must be designed so that the grout used to seal the wells does not dehydrate because of excessive heat caused by an improperly designed heat system.

##### **(1) Grouting Depth of Vertical Heat Pump Wells**

Grouting the annulus of a heat pump well is very important and must be completed immediately after the well is drilled due to cave-in potential. K.A.R 28-30-7 (3) *Plugging of heat pump wells for closed heat pump systems. The entire hole shall be plugged with an approved grouting material from bottom of the hole, to the bottom of the horizontal trench, using a grout tremie or similar method approved by the department.*

##### **(2) Approved Grout Materials.**

The following three (3) grout types are permitted for use in heat pump wells;

(A) Neat cement grout, a mixture consisting of one ninety four (94) pound bag of portland cement to five to six gallons of clean water. ASTM-C150, TYPE I

(B) Cement Grout, A mixture consisting of one ninety four (94) pound bag of portland cement to an equal volume of sand having a diameter no larger than 0.080 inches (2 millimeters) to five to six gallons of clean water. ASTM-C150, Type I

**(C) Bentonite Clay Grout, a mixture consisting of water and commercial grouting or plugging sodium bentonite clay containing high solids such as that manufactured under a number of trade names of bentonite grout, approved by the department.**

1. The mixture shall be as per the manufacture's recommendations to active a weight of not less than nine pounds four ounces (9.4) per gallon of mix. Weighted agents may be added as per manufacture's recommendations.

2. Bentonite hole plug chips will not be allowed.

3. Sodium bentonite products that contain low solids, are designed for drilling purposes, or contain organic polymers shall not be used.

## STANDARD MONITORING WELL DESIGN

### WELL HEAD PROTECTOR

Steel or PVC cover with water tight cap, set in the concrete pad. Should be equipped with a locking device to prevent tampering. Cover should provide adequate space to allow access to the well.

### CONCRETE PAD

Should be a minimum of 2'x 2'x 4" thick to secure the protective cover, prevent pooling of water and vegetative growth around the well, and allow for placement of a surveyor pin.

### IMPERVIOUS GROUT

The upper 20' of the well must be grouted with impervious grout as required by K.A.R. 28-30-2k and 6b (see reverse side for quotes)

### SCREEN SEAL

A 2' layer of bentonite chips or pellets should be placed on the gravel pack to prevent infiltration of grout into the gravel pack.

### GRAVEL PACK

The gravel pack should be sized to prevent infiltration of fines into the well. The source of the gravel pack material should be carefully determined to eliminate the possibility of contamination of the well during construction.

### WELL CASING

Well casing shall terminate not less than one foot above ground surface. The following well casings are acceptable for monitoring well use.

2" I.D. PVC schedule 40 or thicker

4" I.D. PVC SDR 26 or thicker

5" I.D. PVC SDR 26 or thicker

Steel casing shall be 10 gauge or thicker

All casing materials must be connected without use of solvents, glues, or materials which would induce contamination into the well.

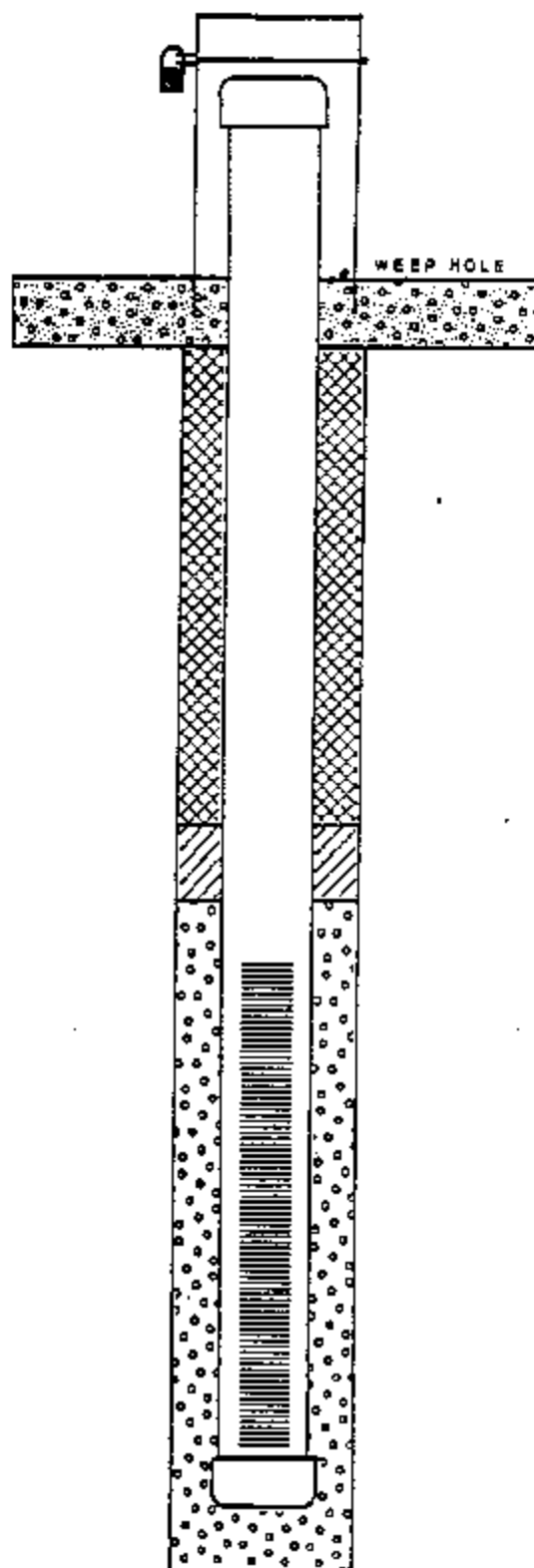
Some other casings are approved for well construction but are not as commonly used. All casing materials must be selected so that incompatibility problems do not occur.

### SCREEN

Wells must be equipped with manufactured well screen which provides adequate communication with the aquifer to provide a representative sample without allowing the sediments to enter the well.

### CONTRACTOR LICENSING

All monitoring wells must be constructed by a licensed water well contractor as specified under K.A.R.28-30-3 (see reverse side for quote)



#### K.A.R. 28-30-2 (k) Grout

Grout means cement grout, neat cement grout, bentonite clay grout or other material approved by the department used to create a permanent impervious watertight bond between the casing and the undisturbed formation surrounding the casing or between two or more strings of casing.

(1) "Neat cement grout" means a mixture consisting of one 94 pound bag of portland cement to five to six gallons of clean water.

(2) "Cement grout" means a mixture consisting of one 94 pound bag of portland cement to an equal volume of sand having a diameter no larger than 0.080 inches (2 millimeters) to five to six gallons of clean water.

(3) "Bentonite clay grout" means a mixture consisting of water and commercial grouting or plugging sodium bentonite clay containing high solids such as that manufactured under the trade name of "volclay grout", or an equivalent as approved by the department.

(A) The mixture shall be as per the manufacturer's recommendations to achieve a weight of not less than 9.4 pounds per gallon of mix. Weighing agents may be added as per the manufacturer's recommendations.

(B) Sodium bentonite pellets, tablets or granular sodium bentonite may also be used provided they meet the specifications listed in K.A.R. 28-30-2(k), (3), above.

(C) Sodium bentonite products that contain low solids, are designed for drilling purposes or that contain organic polymers shall not be used.

#### K.A.R. 28-30-6 (b) Grouting

(1) Constructed or reconstructed wells shall be sealed by grouting the annular space between the casing and the well bore from ground level to a minimum of 20 feet or to a minimum of five feet into the first clay or shale layer, if present, whichever is greater. If a pitless well adapter or unit is being installed, the grouting shall start below the junction of the pitless well adapter or unit where it attaches to the well casing and shall continue a minimum of 20 feet below this junction or to a minimum of five feet into the first clay or shale layer whichever is greater.

(2) To facilitate grouting, the grouted interval of the well bore shall be drilled to a minimum diameter at least three inches greater than the maximum outside diameter of the well casing. If a pitless well adapter or unit is being installed on the well's casing, the well bore shall be a minimum diameter of at least three inches greater than the junction diameter of the well casing through the grouted interval below the junction of the pitless well adapter or unit where it attaches to the well casing.

(c) If groundwater is encountered at a depth less than the minimum grouting requirement, the grouting requirement may be modified to meet local conditions if approved by the department.

#### K.A.R. 28-30-3 Licensing

(a) Eligibility. To be eligible for a water well contractor's license an applicant shall:

- (1) Have passed an examination conducted by the department; or
- (2) meet the conditions contained in subsection (c).

(b) Application fees.

(1) Each application shall be accompanied by an application fee of \$10.00.

(2) Before issuance of a water well contractor's license, each contractor shall pay a license fee of \$100.00 plus \$25.00 for each drill rig operated by or for the contractor. These fees shall accompany the application and shall be by bank draft, check or money order payable to the Kansas department of health and environment - water well licensure.

(c) Reciprocity.

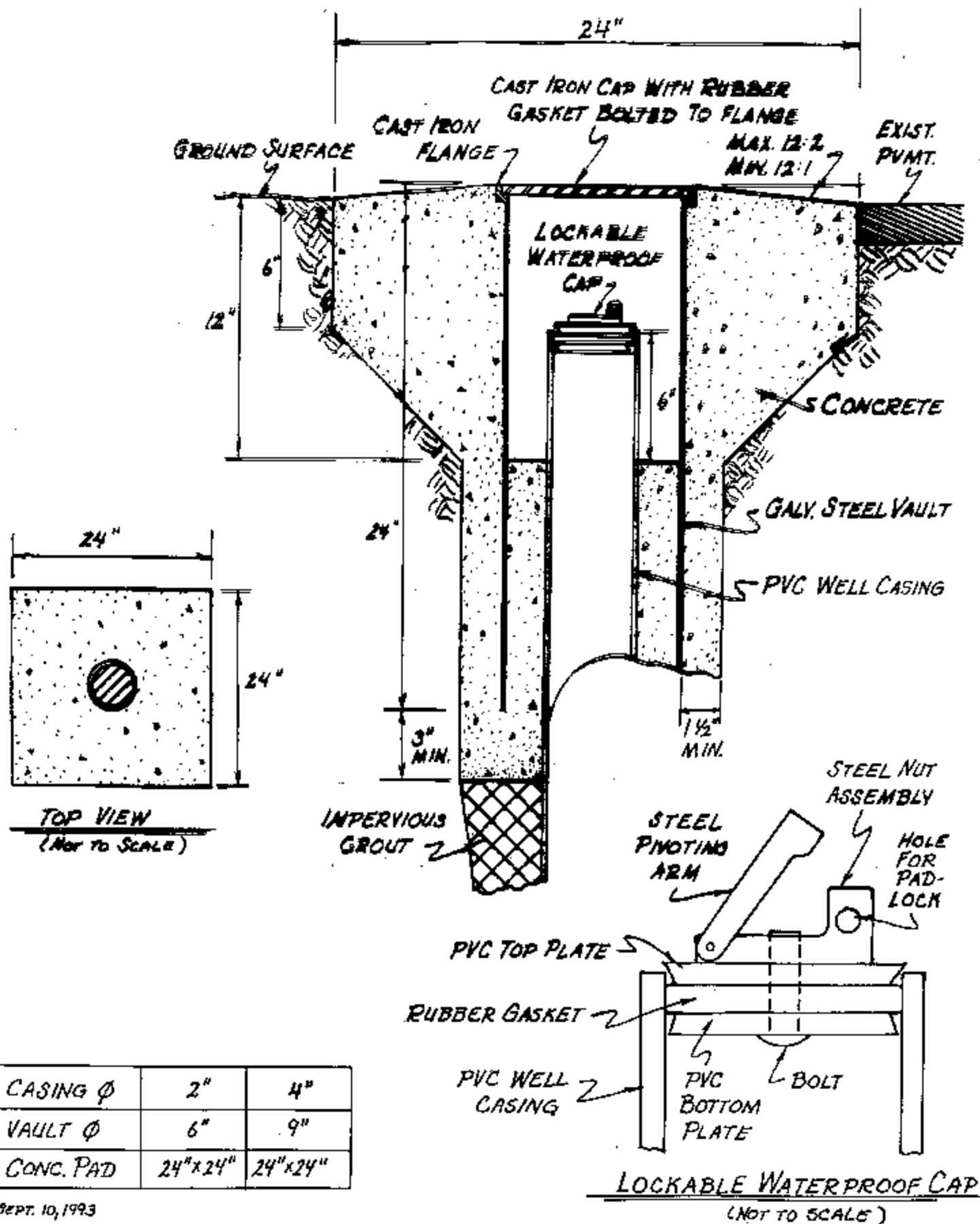
(1) Upon receipt of an application and payment of the required fees from a nonresident, the secretary may issue a license, providing the nonresident holds a valid license from another state and meets the minimum requirements for licensing as prescribed in K.S.A. 82a-1207, and any amendments thereto.

(2) If the nonresident applicant is incorporated, evidence shall be submitted to the department of health and environment showing that the applicant meets the registration requirements of Kansas secretary of state.

(3) Nonresident fees for a license shall be equal to the fee charged a Kansas contractor by the applicant's state of residence but shall not be less than \$100.00. The application fee and drill rig license fee shall be the same as the Kansas resident fees.

# FLUSH-MOUNT WELL CONSTRUCTION DETAIL

(NOT TO SCALE)



SEPT. 10, 1993

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## MONITORING WELL DESIGN ADDITIONAL INSTRUCTIONS

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### Flush-Mount Well Head Completion:

K.A.R. 28-30-6(e) does not allow well casing to be terminated less than one foot above finished ground surface. Because state trust fund site investigations are often conducted in areas where completing monitoring well heads above grade is not practical, consideration must be given to completing flush-mount monitoring well heads.

If monitoring wells must be completed with a flush-mount well head design, a waiver of K.A.R. 28-30-6(e) must be requested in writing. The procedures for requesting a waiver of this regulation are described as follows:

1. Prior to the monitoring well installation, the written request must be submitted to Mr. Don Taylor at the address indicated below.
2. The request must contain the following information:
  - a. Facility name and street address;
  - b. Legal description of the property where the wells are proposed to be located;
  - c. Number of wells to be installed with flush-mount well heads;
  - d. Reason(s) why the regulation should be waived;
  - e. Approximate depth to groundwater in the local area;
  - f. The general geology or lithologies expected to be encountered in drilling; and
  - g. Specifications and/or diagrams of the vault proposed to be installed including the manufacturer's name and any other descriptive information such as a manufacturer's trade sheet.
3. Wait for approval of the waiver request before completing monitoring wells.
4. When waivers are approved and monitoring wells are installed with a flush-mount well head design, the well head completion must be indicated accordingly in the lithologic section of the WWC-5 water well record form. The name of the KDHE contact person that approved the waiver must also be provided in the lithologic section of the WWC-5 form.

Any waiver of regulations applies only to the wells and information indicated in the written request. A verbal request for waiver of regulations may be approved on any additional wells needed for the same area or site. The verbal request must be directed to Mr. Don Taylor.

### Monitoring Well Grouting Requirements:

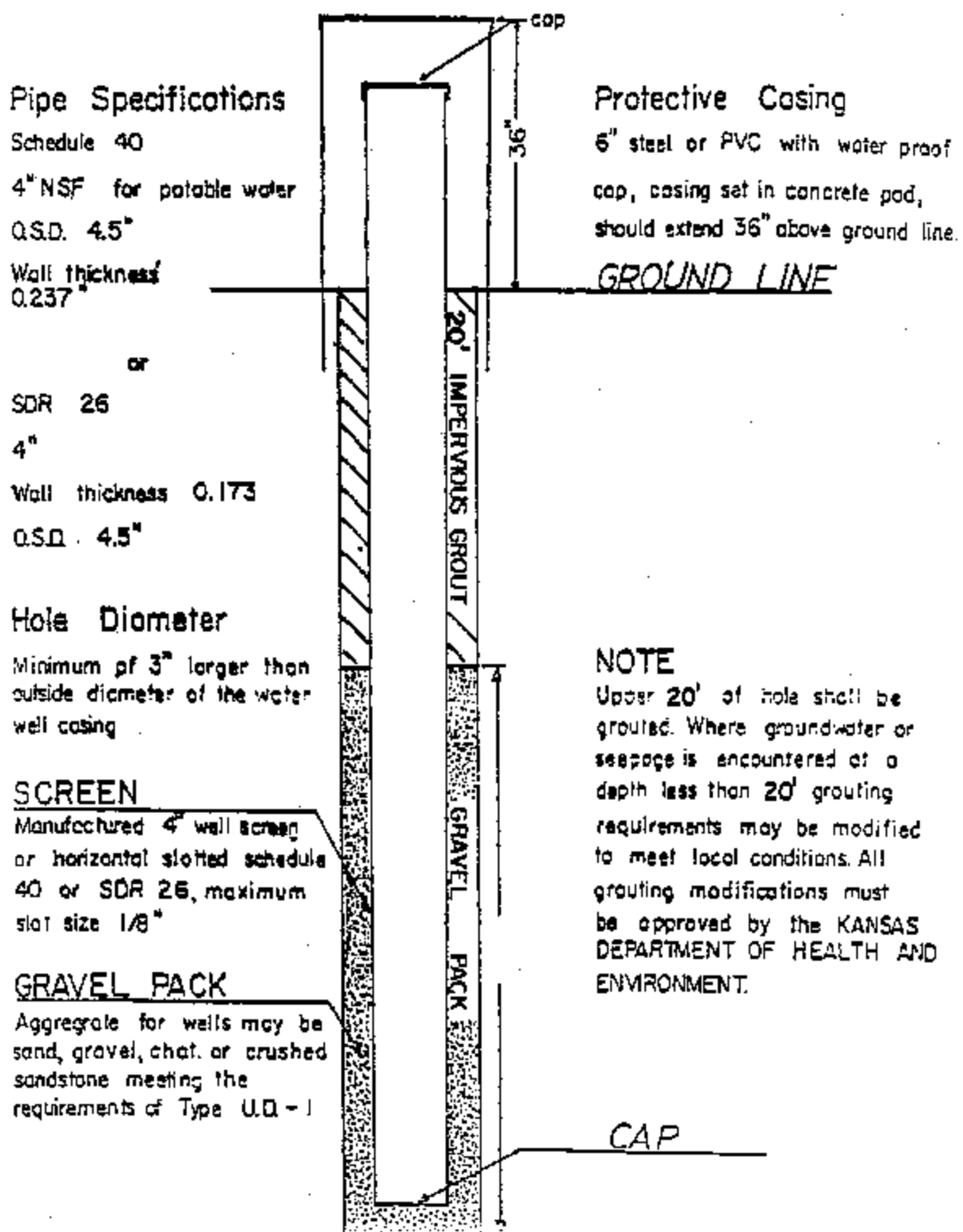
K.A.R. 28-30-6, part (b) requires that constructed or reconstructed wells be sealed by grouting the annular space between the casing and the well bore from ground level to a minimum of 20 feet or to a minimum of five feet into the first clay layer, whichever is greater. Part (c) of the same regulation specifies if groundwater is encountered at a depth less than the minimum grouting requirements, the grouting requirement may be modified to meet local conditions if approved by the department.

If modifications to the grouting requirements are necessary solely because of shallow groundwater, a waiver of the regulations is not needed; however, the reason for modifying the grouting requirements must be indicated accordingly on the WWC-5 water well record form. In situations where grouting modifications are required for reasons other than shallow groundwater, a waive of K.A.R. 28-30-6(b) must be obtained following the same procedures as described for flush-mount well heads above.

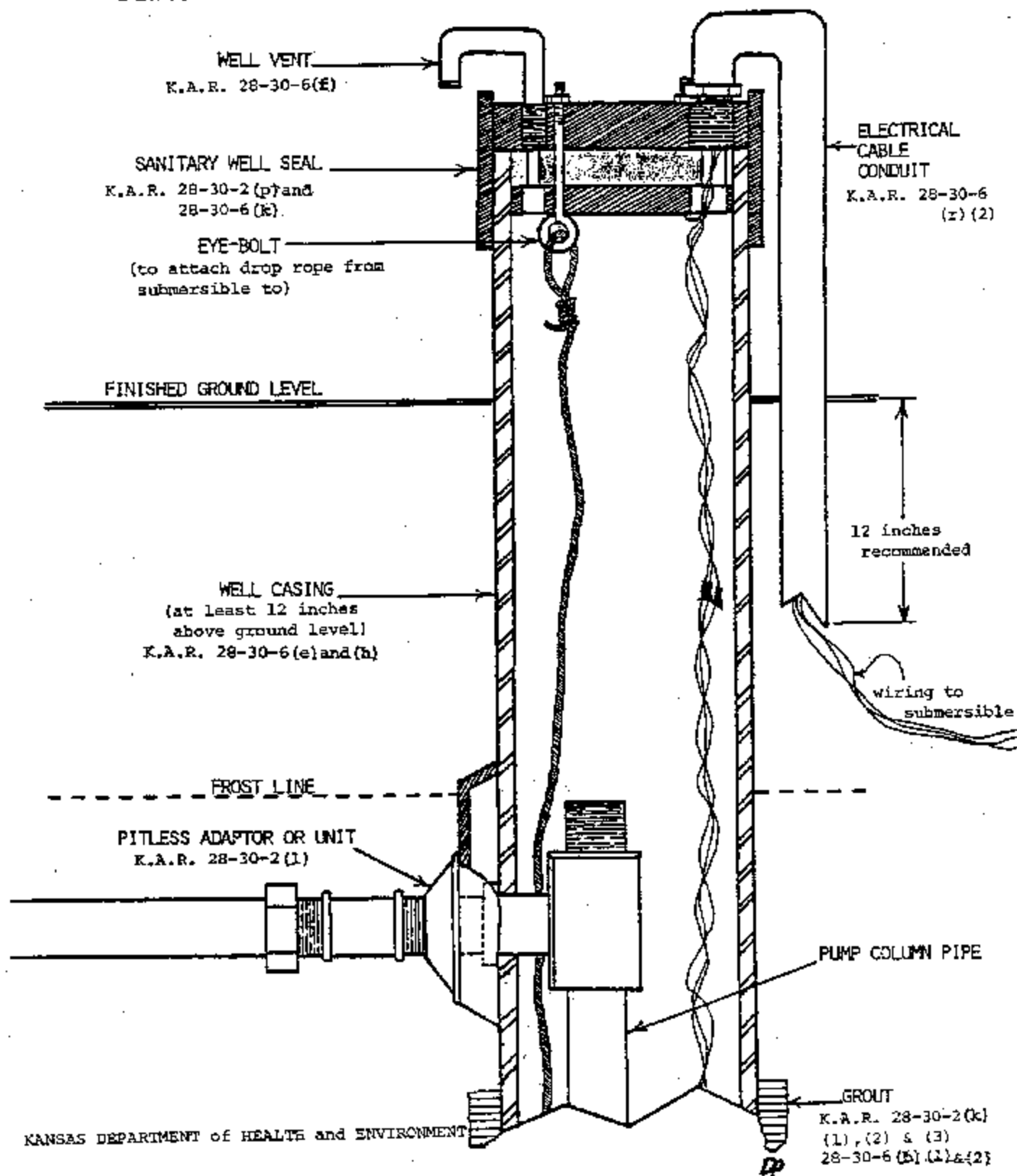
Submit requests for waivers and direct any questions on well design regulations to:

Mr. Don Taylor  
Kansas Department of Health & Environment  
Bureau of Water - Geology Section  
1000 S.W. Jackson Street, Suite #420  
Topeka, Kansas 66612-1367  
Phone: (785) 296-5522

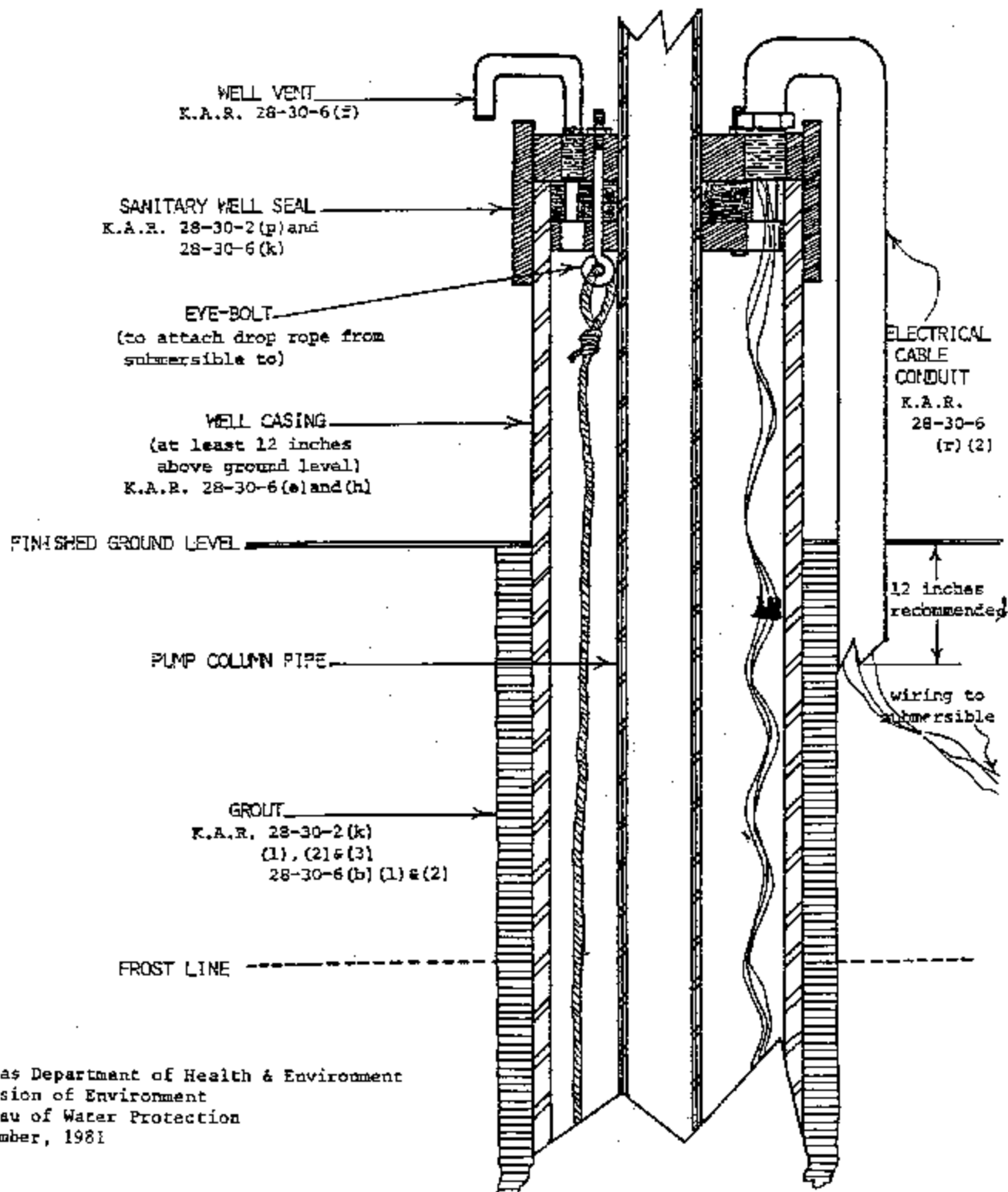
# STANDARD CASED TEST HOLE DESIGN



# WATER WELL COMPLETION DIAGRAM USING SUBMERSIBLE PUMP WITH PITLESS

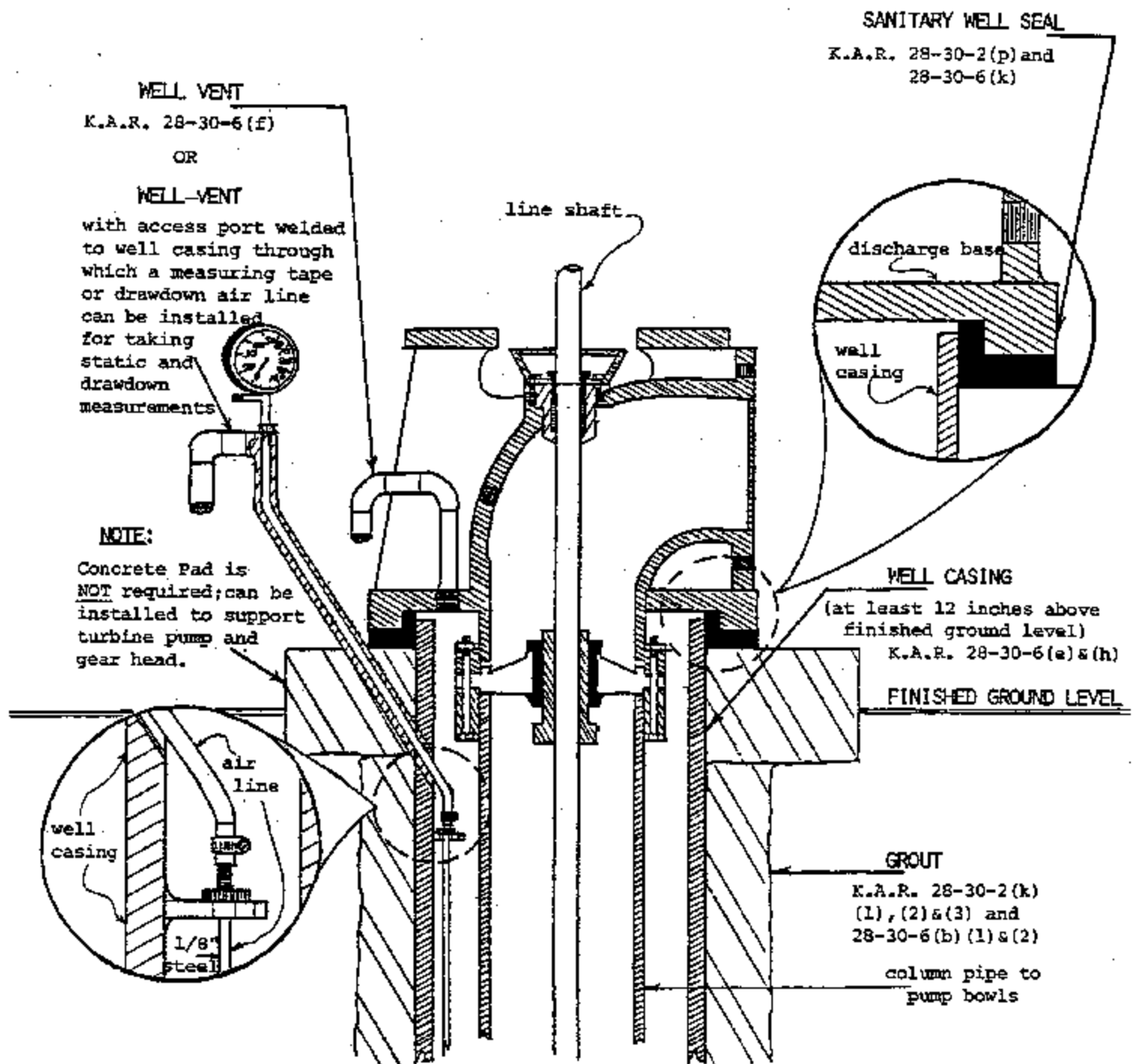


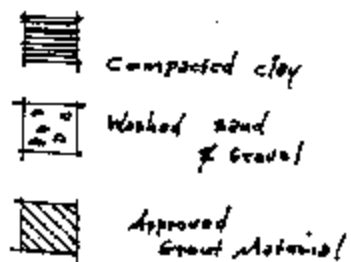
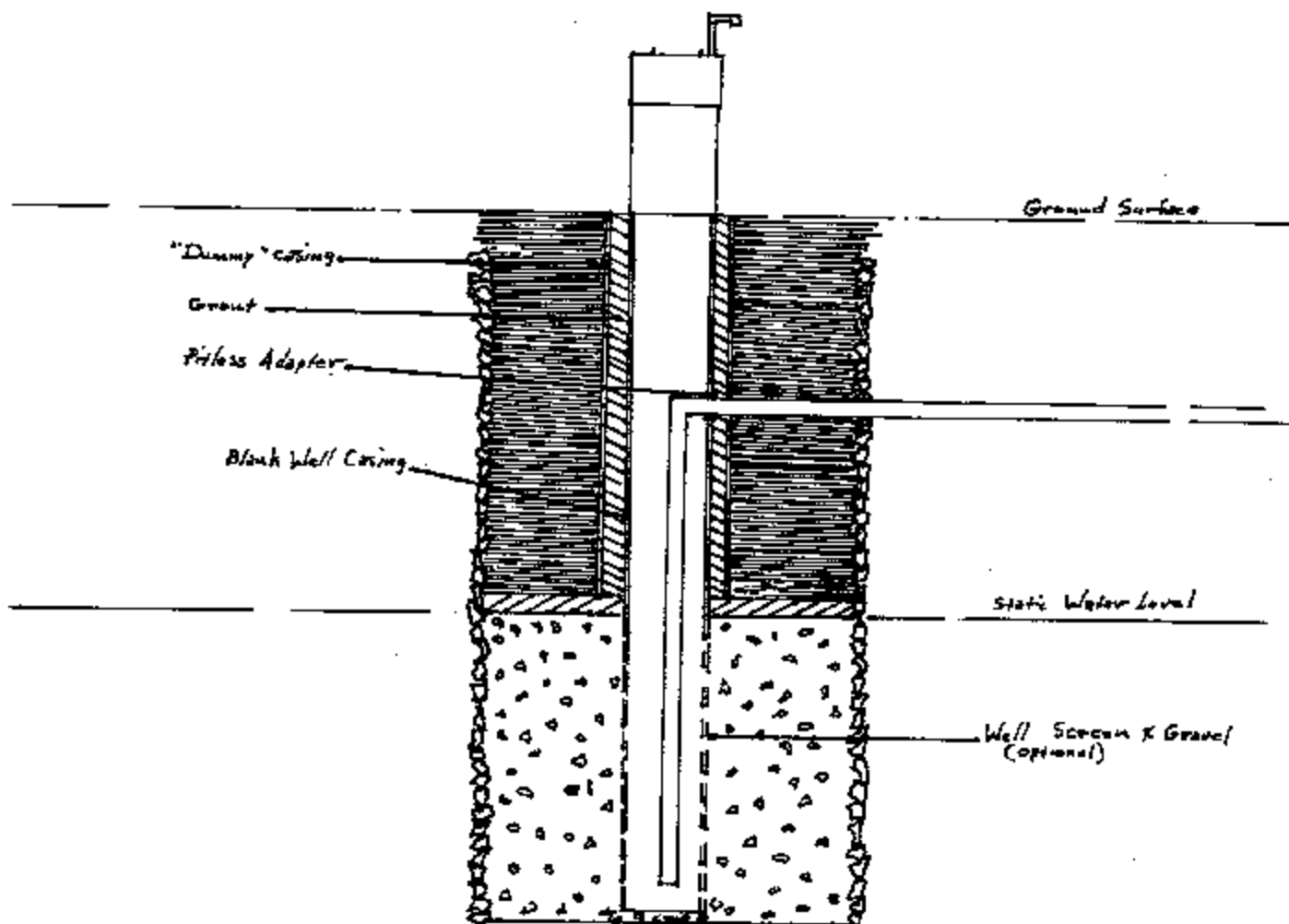
# WELL HEAD COMPLETION DIAGRAM USING SUBMERSIBLE PUMP WITHOUT PITLESS



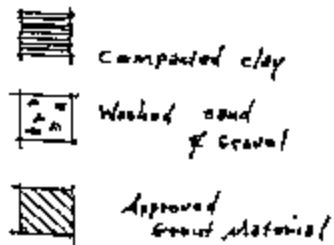
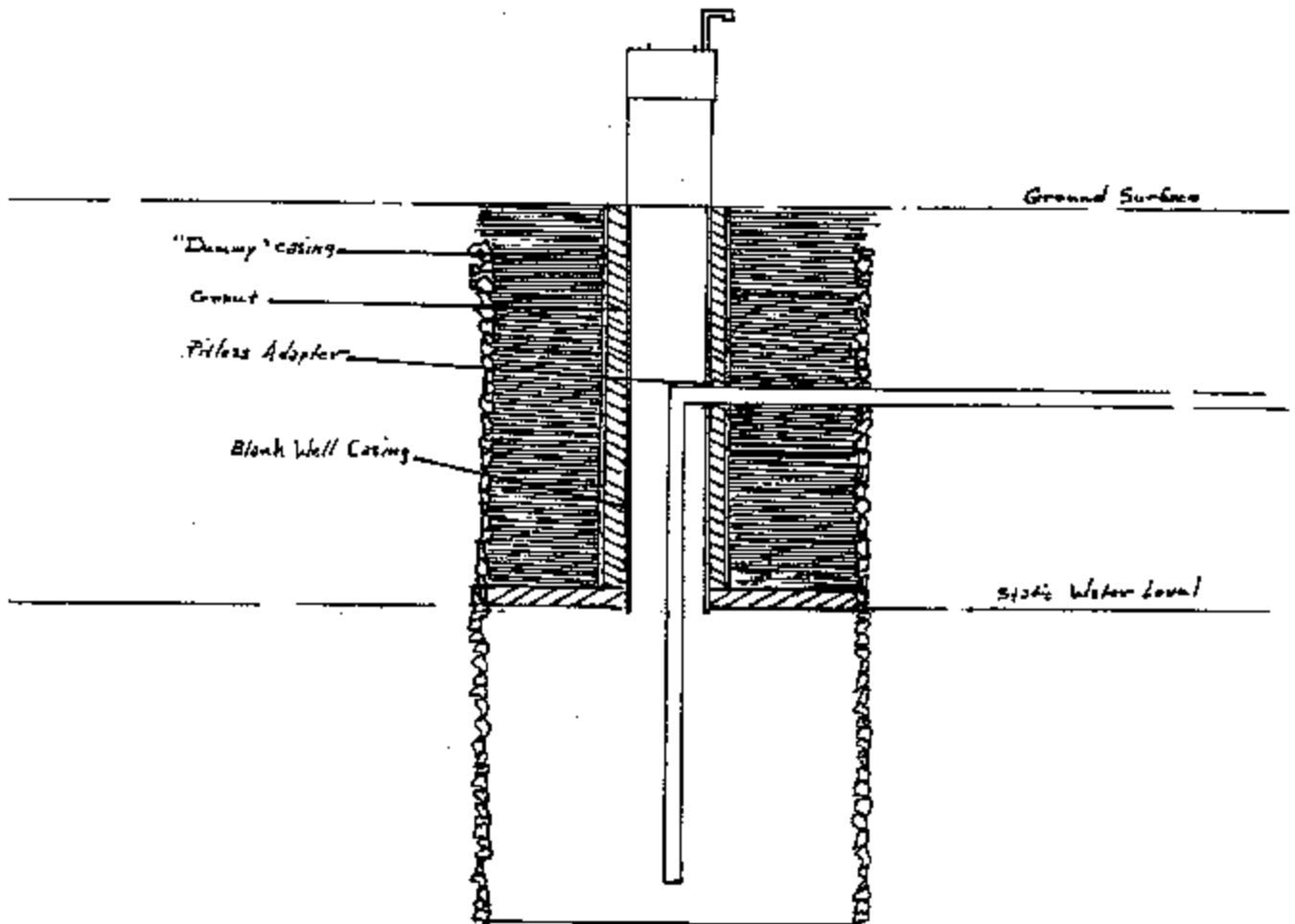
# WATER WELL COMPLETION DIAGRAM

IRRIGATION OR INDUSTRIAL WELL USING ABOVE GROUND DISCHARGE  
WITH LINE SHAFT TURBINE PUMP





Dug Well Reconstruction



Dug Well Reconstruction  
(Open Hole)



## METHODS FOR CHLORINATING PRIVATE WATER SUPPLIES

1. The well cover should be removed so that fluid can be dumped or poured into the well, if possible the pumping system should remain functional. Caution must be taken to avoid electrical shock.
2. The volume of water contained in the system should be estimated so that the appropriate amount of chlorine bleach can be added. The volume of water in the well, piping, pressure tank, and water heater must be totaled.
  - a. The volume of the well should be estimated by subtracting the depth to the water inside the well from the total depth of the well. This will tell you how many feet of water are in the well. The attached chart shows how many gallons of water per foot are contained in each different size (diameter) wells.
  - b. The volume of the water heater and the pressure tank (if used) should be readily available.
  - c. The piping from the well to the point of use can be estimated at between 20 and 100 gallons depending on the length and size of piping to the house and the number of sinks, toilets, showers or other dispensers. If the well is a long distance from the house (over 200 ft.) Some additional volume should be added.
  - d. Total the volume of water contained in the entire system.
    1. The amount of water contained in the well \_\_\_\_\_
    2. Capacity of the water heater \_\_\_\_\_  
Capacity of the pressure tank \_\_\_\_\_
    3. Estimated volume contained in the piping \_\_\_\_\_
    4. Total: Add the four numbers above to obtain the  
total volume of water in the system. \_\_\_\_\_

One ounce of chlorine bleach should be added for every 2 gallons of water in the system. More chlorine may be required for heavy concentrations of bacteria to insure that the disinfection of the system is complete. In most cases  $\frac{1}{2}$  to 1 gallon of chlorine laundry bleach is an ample amount to obtain complete disinfection of the system even with heavy bacteria concentrations. The chlorine bleach should be diluted before it is added to the well to minimize any corrosion of metal casing or pump parts from concentrated chlorine.

3. Obtain a tank or enough clean buckets or containers which can be filled with chlorinated water to equal at least the volume of water contained in the well. The chlorine solution can be mixed up by adding 1 oz. of chlorine bleach to every 2 gallons of water in the containers. These containers should be placed near the well before the chlorine solution is mixed since they will be poured into the well once step 4 has been completed.

4. Add the required amount of chlorine to the well. Run the hose from the nearest facet to the well and circulate the chlorine mixture through the hose and back into the well. By circulating the water in the well an even mixture of chlorine solution can be obtained. While mixing the chlorine solution with the hose the sides of the casing and the drop pipe for the pump can be washed with the chlorinated mixture.

A strong odor of chlorine smell should be present after the mixing process has been completed. If the chlorine smell is not strong, more chlorine should be added.

5. Pour the mixture of chlorinated water into the well and allow the well to set for 2 or more hours before proceeding with step 6.
6. Run water from each faucet in the distribution system until a chlorine odor is present in the water. This should be done for hot and cold water. The hot water should take longer than the cold because the hot water tank holds a large volume of water. Chlorinated water should be allowed to enter all the lines in the distribution system including lines to bathtubs, showers, toilets and outside hydrants so complete disinfection can be achieved. Carbon filters should be removed or bypassed. The air pressure should be released from the pressure tank (except those with a permanent air cushion) so that the entire tank may be filled with chlorinated water.

Caution: Some pressure tanks may be damaged by strong chlorine solutions. The manufacturer should be contacted to provide needed information about disinfection of the pressure tank.

It may be necessary to repeat steps 4 and 5 if the chlorine smell reaching the facets is weak. The chlorinated water should be allowed to remain in the well and piping for 12 to 24 hours if possible.

The chlorinated water contained in the system should be pumped to waste when the allotted time has passed. The water having a strong chlorine smell should not be discharged to a septic tank as it may kill the needed microorganisms in the septic system. This water should be discharged onto a driveway or area where damage will not be done to vegetation or other property. The chlorinated water contained in the plumbing system should be discharged until the chlorine odor is absent from all water sources. A small amount of chlorinated water contained in the plumbing of the house should not affect the septic tank. If bacteria problems persist, the chlorination process may need to be repeated.

After the well has been chlorinated, the well must be sealed to prevent surface water, small animals and insects from entering the well. A screened vent should be provided in the casing or well seal so air may enter the well but water and insects cannot.

Some wells are constructed so that it is not possible to install a positive well seal such as a dug well. These wells can be reconstructed and cased or a continuous chlorination system can be installed which will kill the unwanted bacteria.

If after reading this publication you are unsure of this procedure for chlorination, you may contact the Bureau of Water within the Department of Health and Environment located in Topeka (785) 296-5522 or one of the six district offices at the locations shown below.

Dodge City	(620) 225-0596
Wichita	(316) 337-6020
Chanute	(620) 431-2390
Lawrence	(785) 842-4600
Salina	(785) 827-9639
Hays	(785) 625-5664

<b><u>Pipe or Well Diameter (Inches)</u></b>	<b><u>Gallons of Water Per Foot of Length</u></b>
½	.010
¾	.023
1	.041
1 ¼	.067
1 ½	.092
2	.163
2 ½	.255
3	.37
3 ½	.50
4	.65
5	1.02
6	1.50
8	2.60
10	4.08
12	5.87
14	8.00
16	10.44
18	13.21
24	23.50
30	63.70

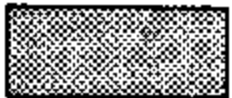
# PLUGGING MATERIAL KEY CODE



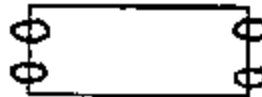
GROUT



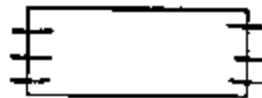
SOIL OR CLAY



SAND & GRAVEL

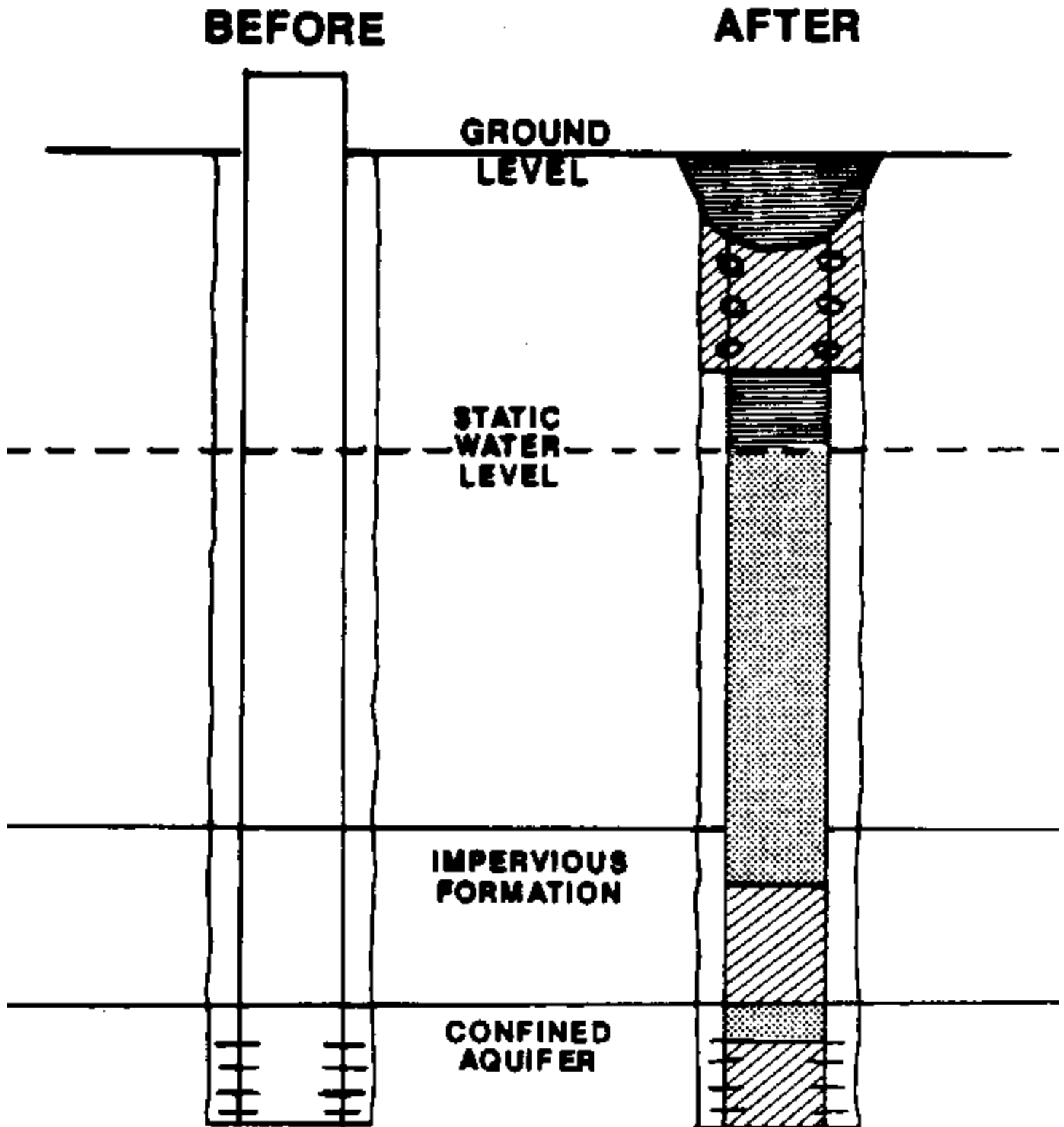


CASING RIPPED



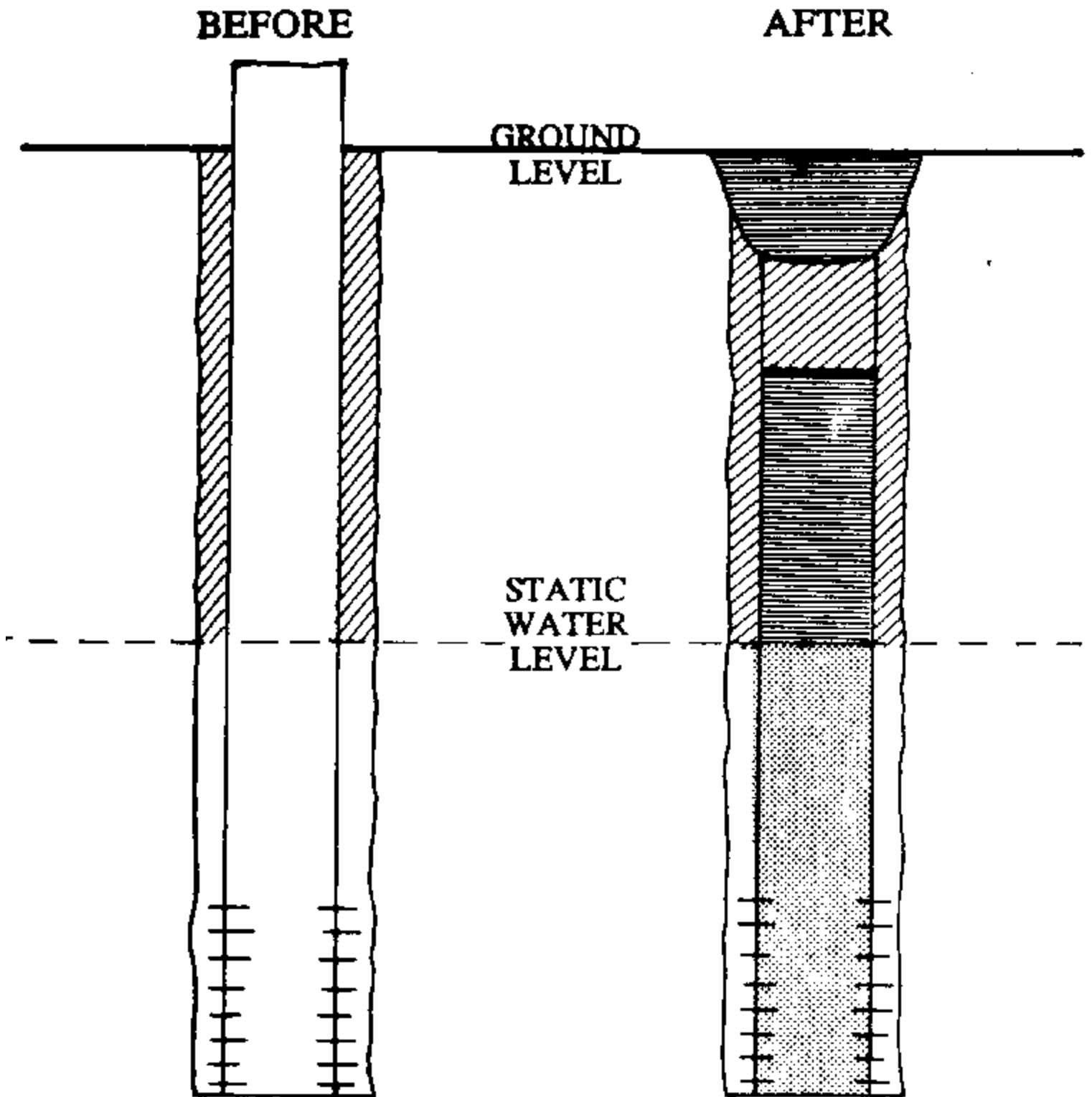
WELL SCREEN

# PLUGGING OF AN UNCONFINED WELL (not grouted)



# PLUGGING OF AN UNCONFINED WELL

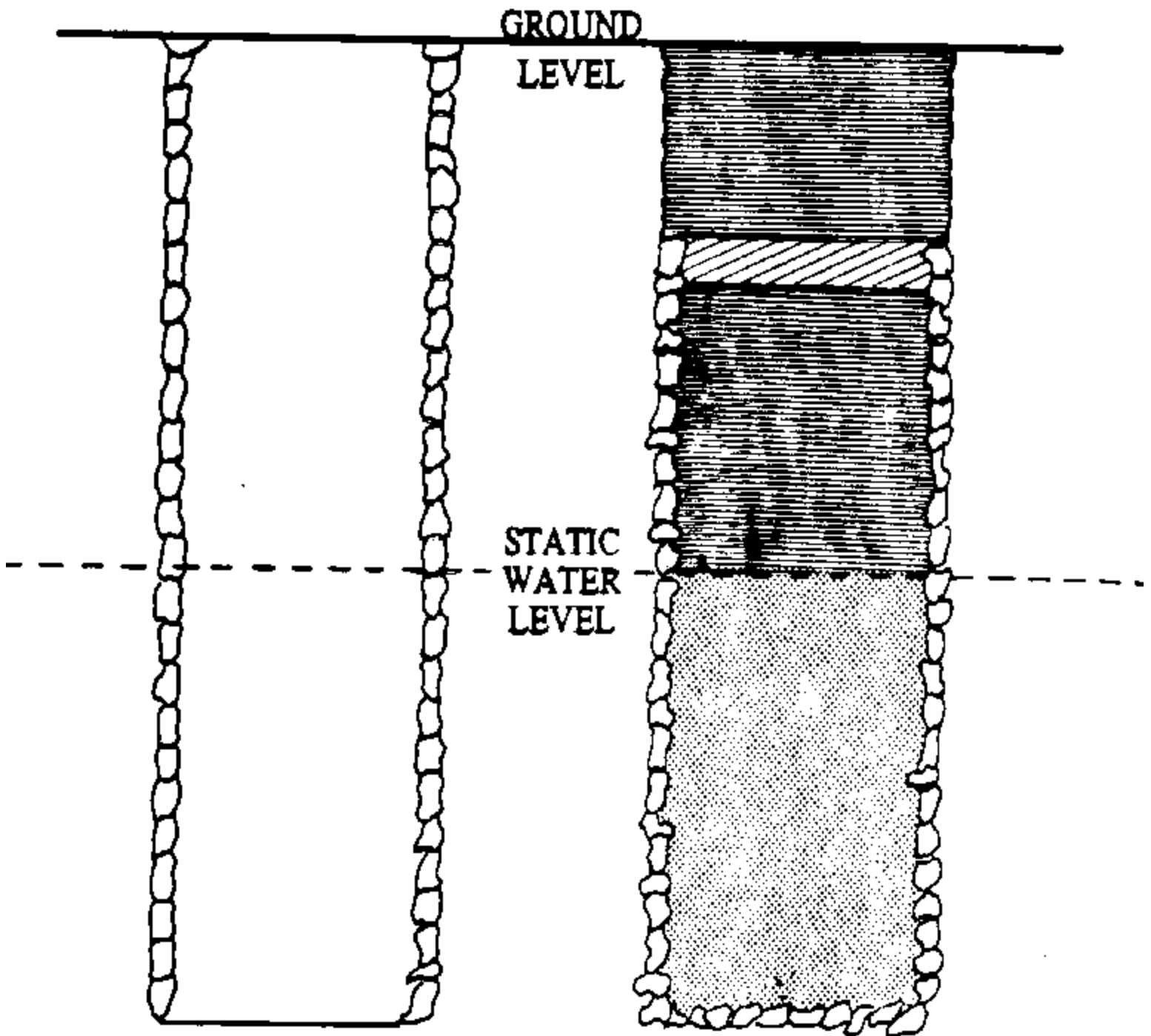
(grouted)



# PLUGGING OF A DUG WELL

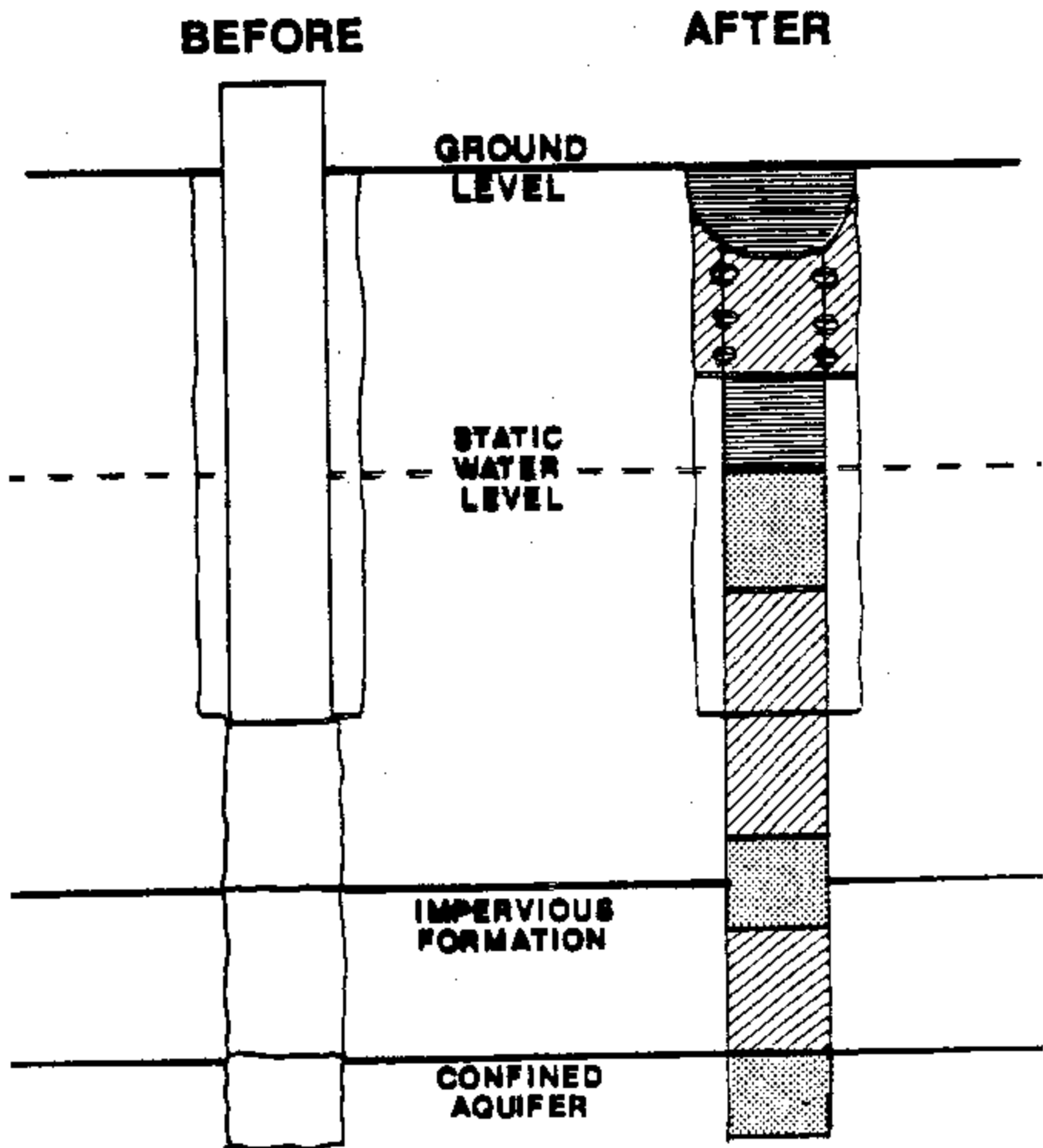
BEFORE

AFTER

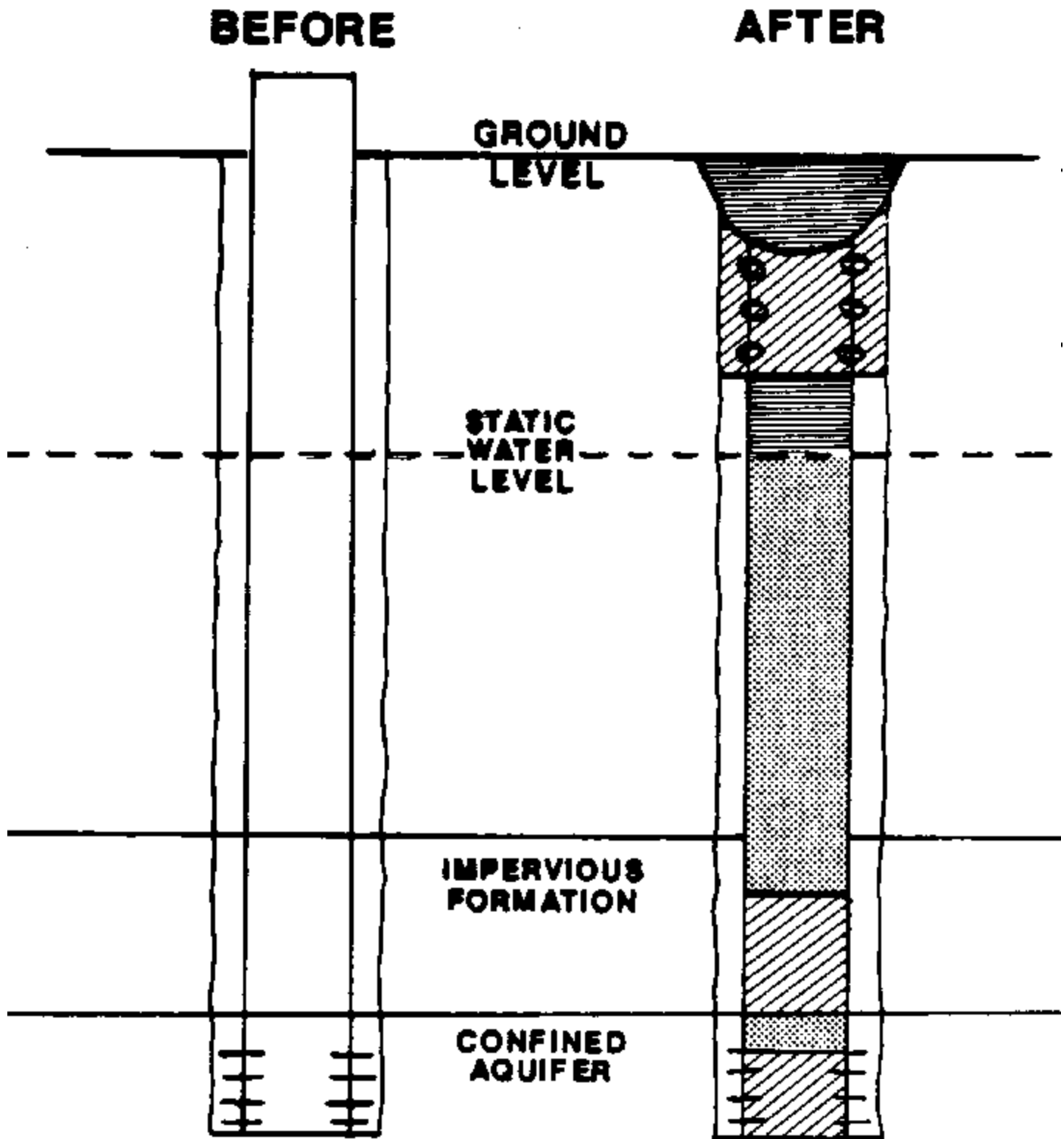


# PLUGGING OF A CONFINED WELL

(open hole, ungrouted)

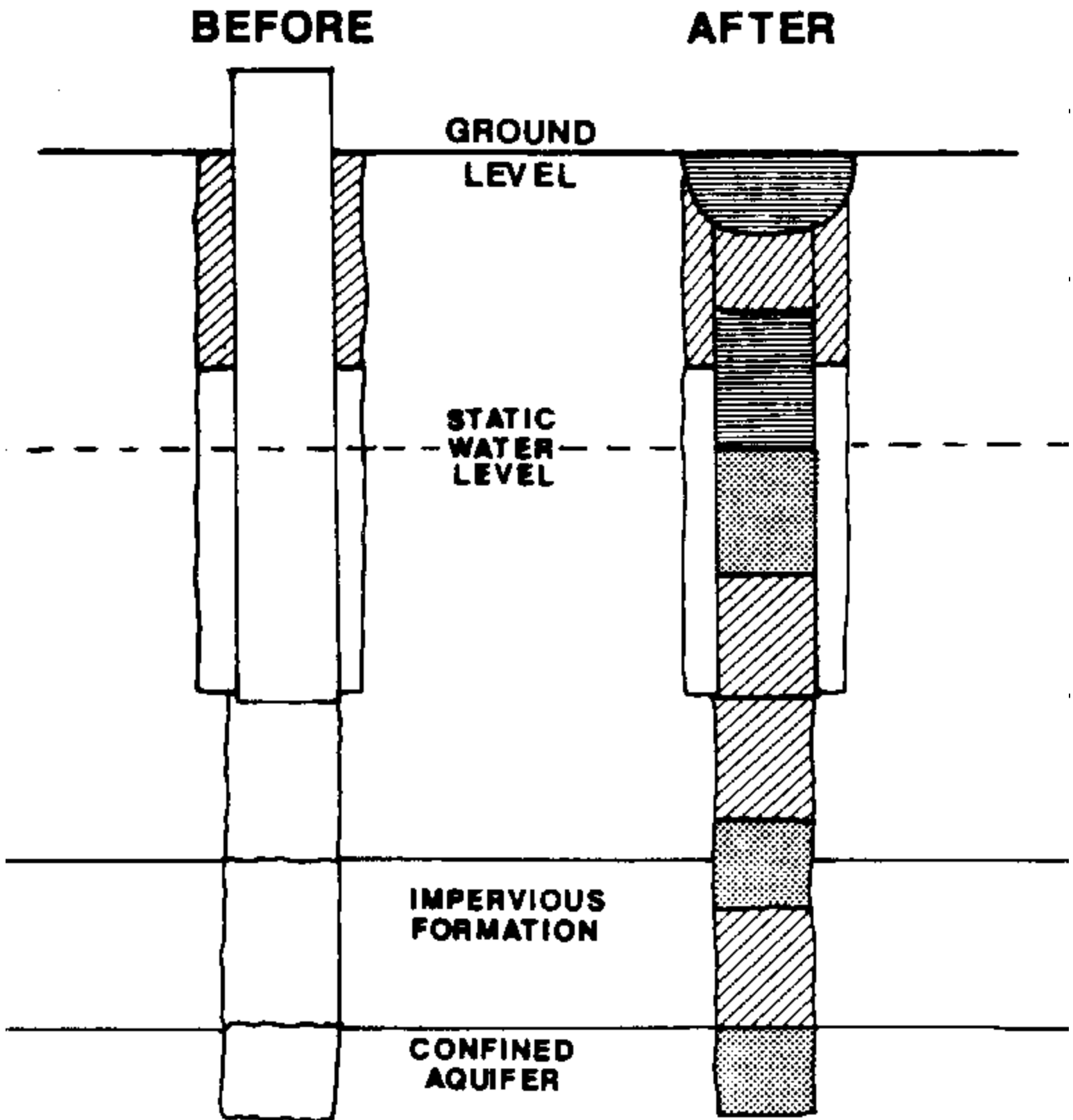


# PLUGGING OF A CONFINED WELL (not grouted)

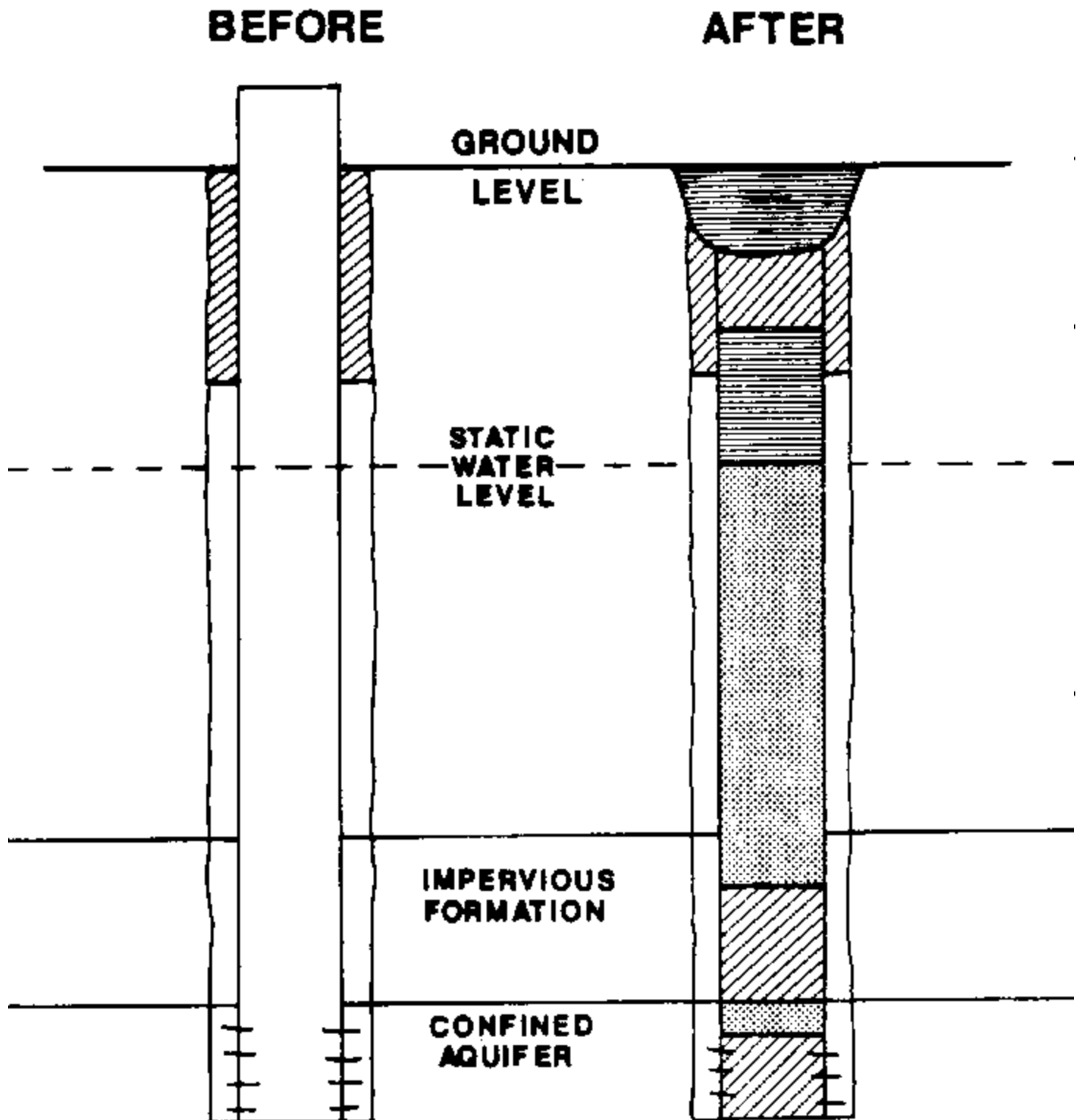


# PLUGGING OF A CONFINED WELL

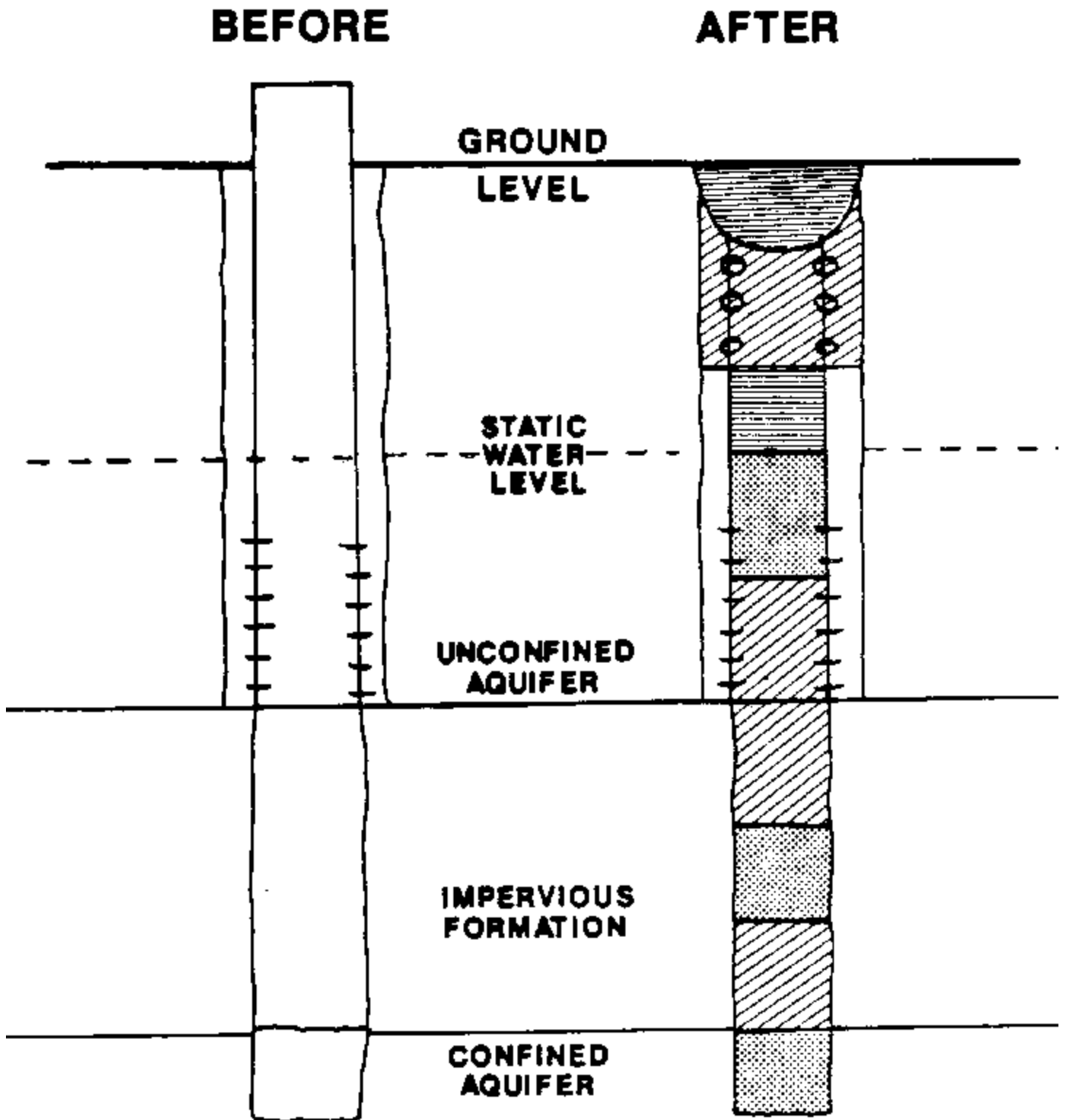
(open hole, grouted)



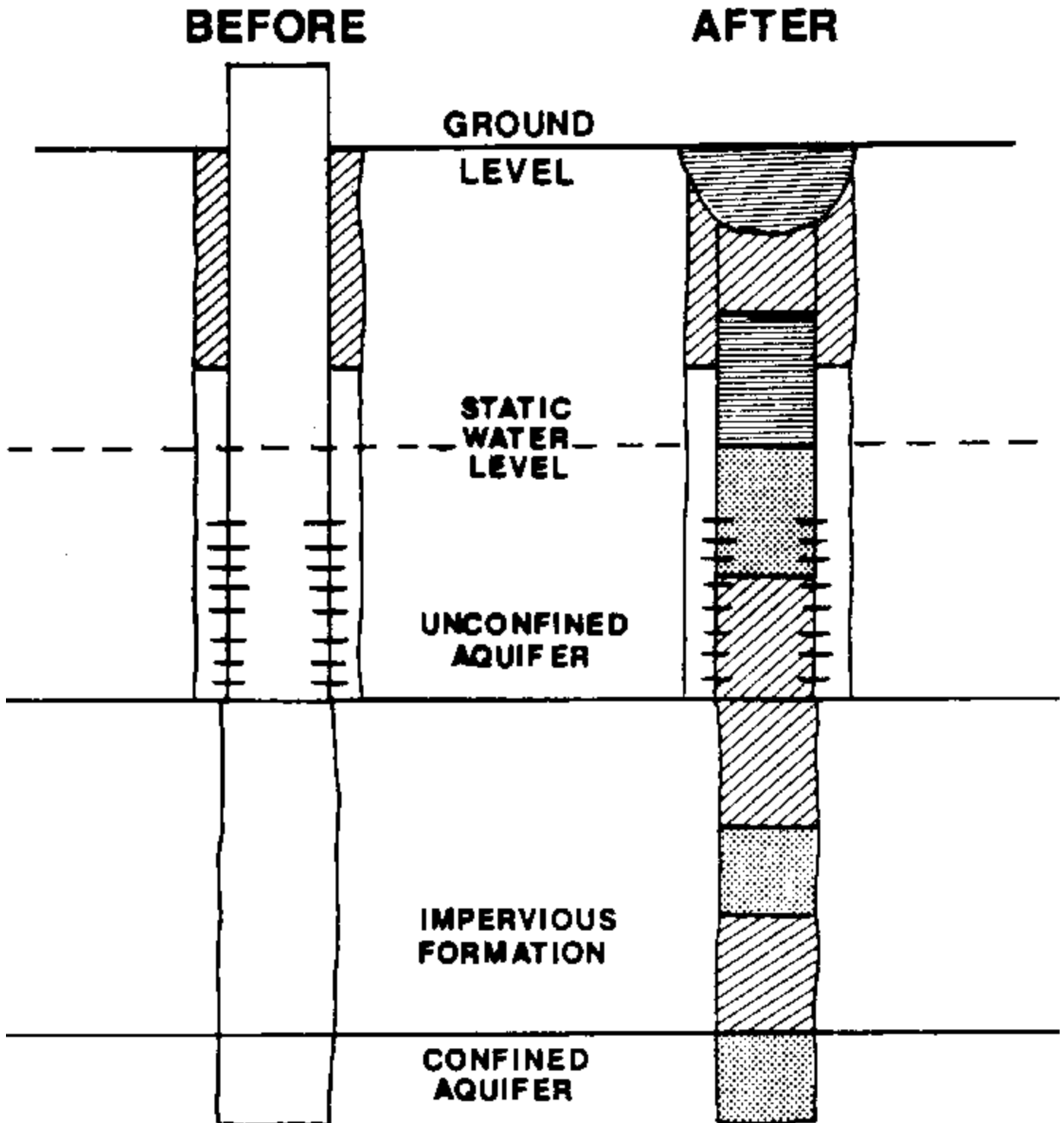
# PLUGGING OF A CONFINED WELL (grouted)



# PLUGGING OF AN UNCONFINED, CONFINED WELL (open hole, ungrouted)



# PLUGGING OF AN UNCONFINED, CONFINED WELL (open hole, grouted)



# PLUGGING OF AN UNCONFINED, CONFINED WELL (not grouted)

**BEFORE**

**AFTER**

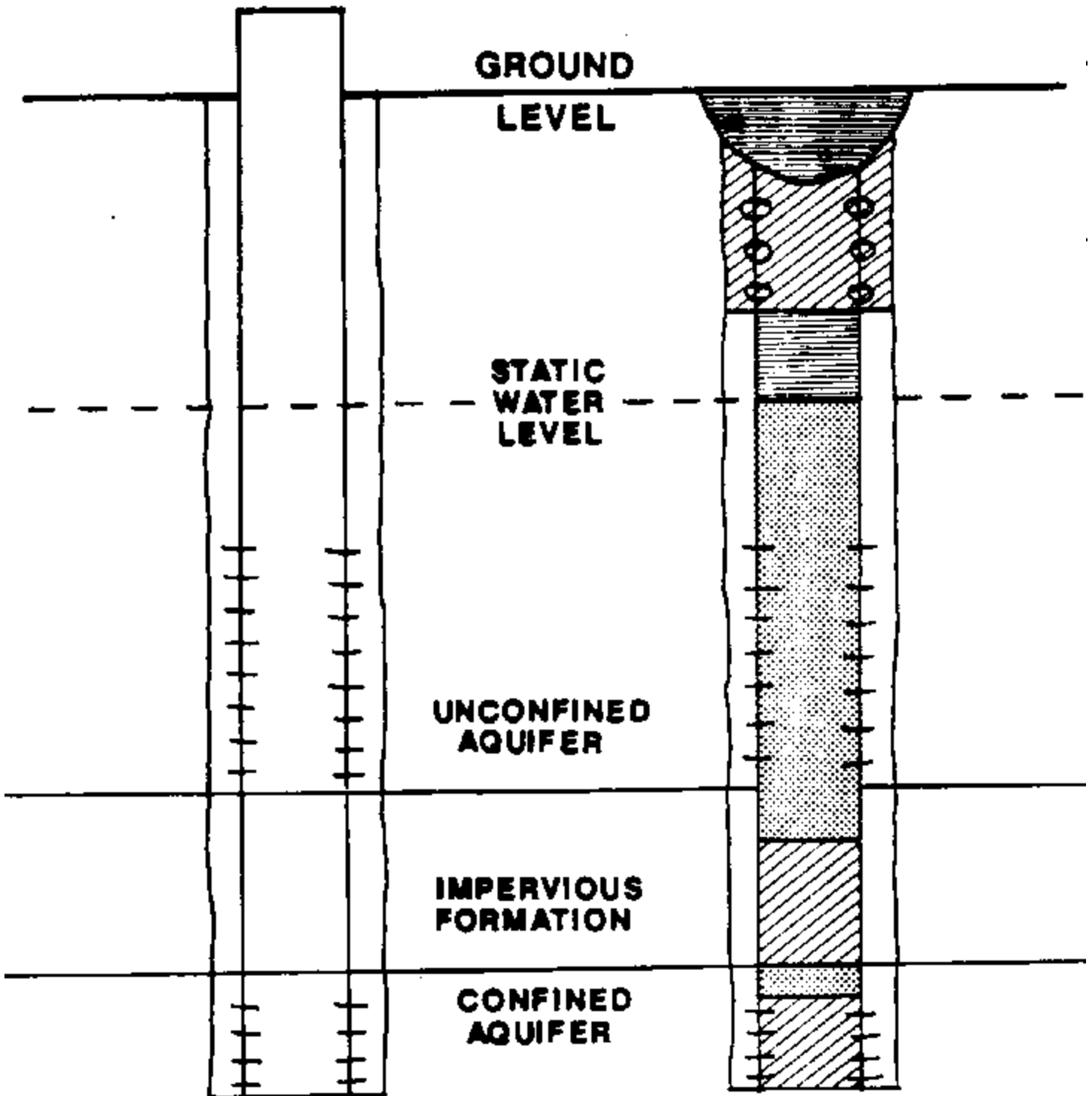
**GROUND  
LEVEL**

**STATIC  
WATER  
LEVEL**

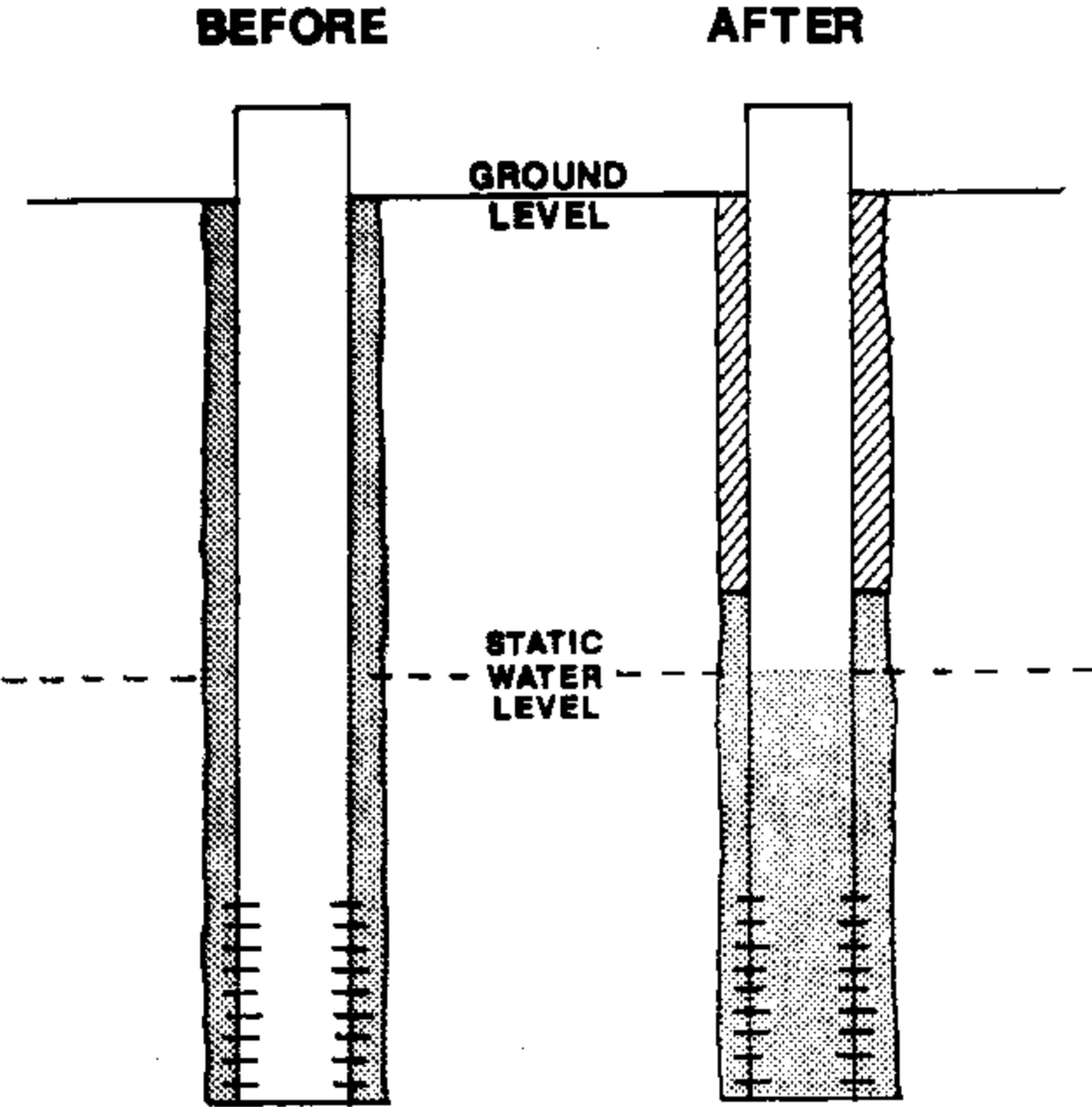
**UNCONFINED  
AQUIFER**

**IMPERVIOUS  
FORMATION**

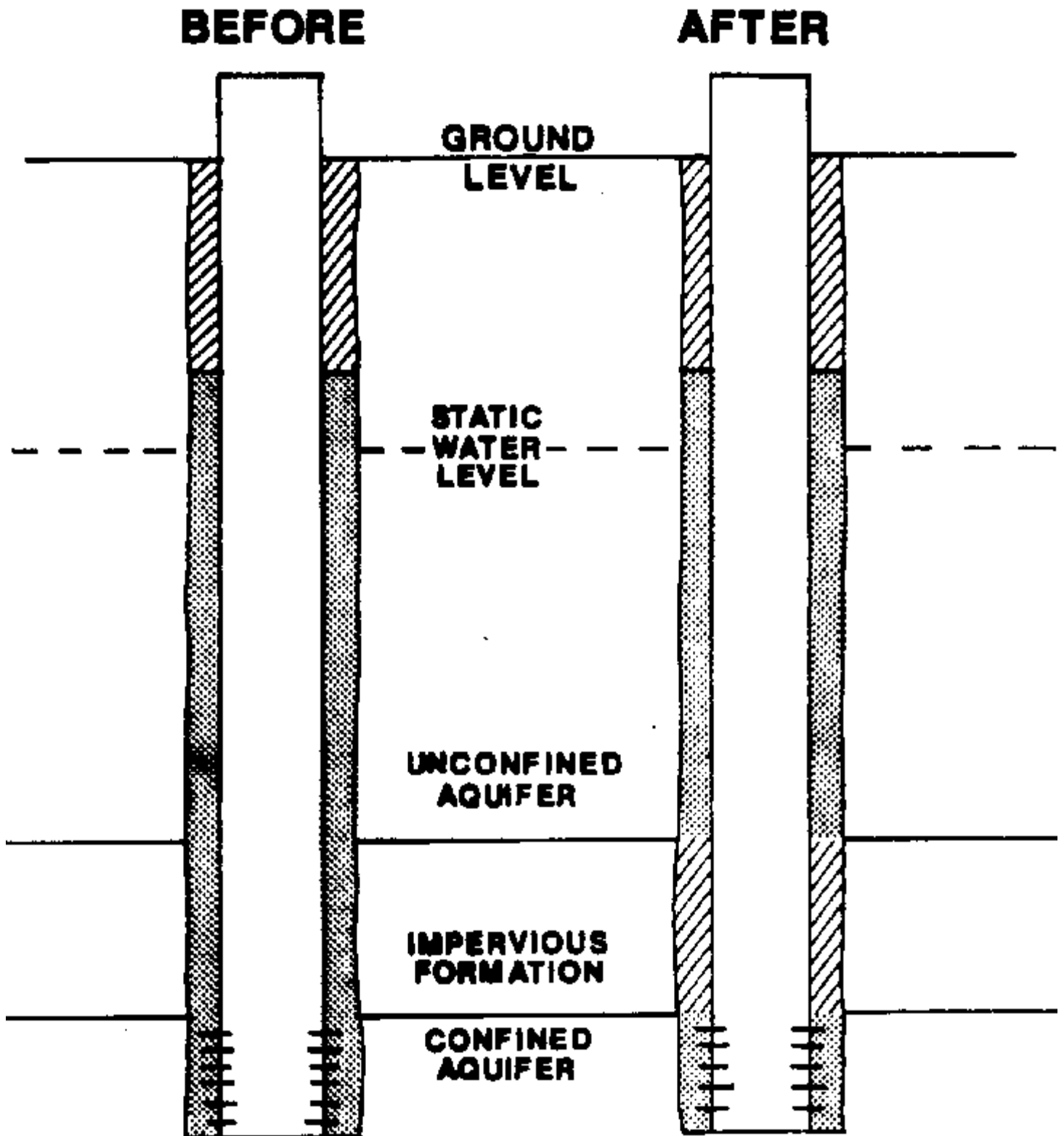
**CONFINED  
AQUIFER**



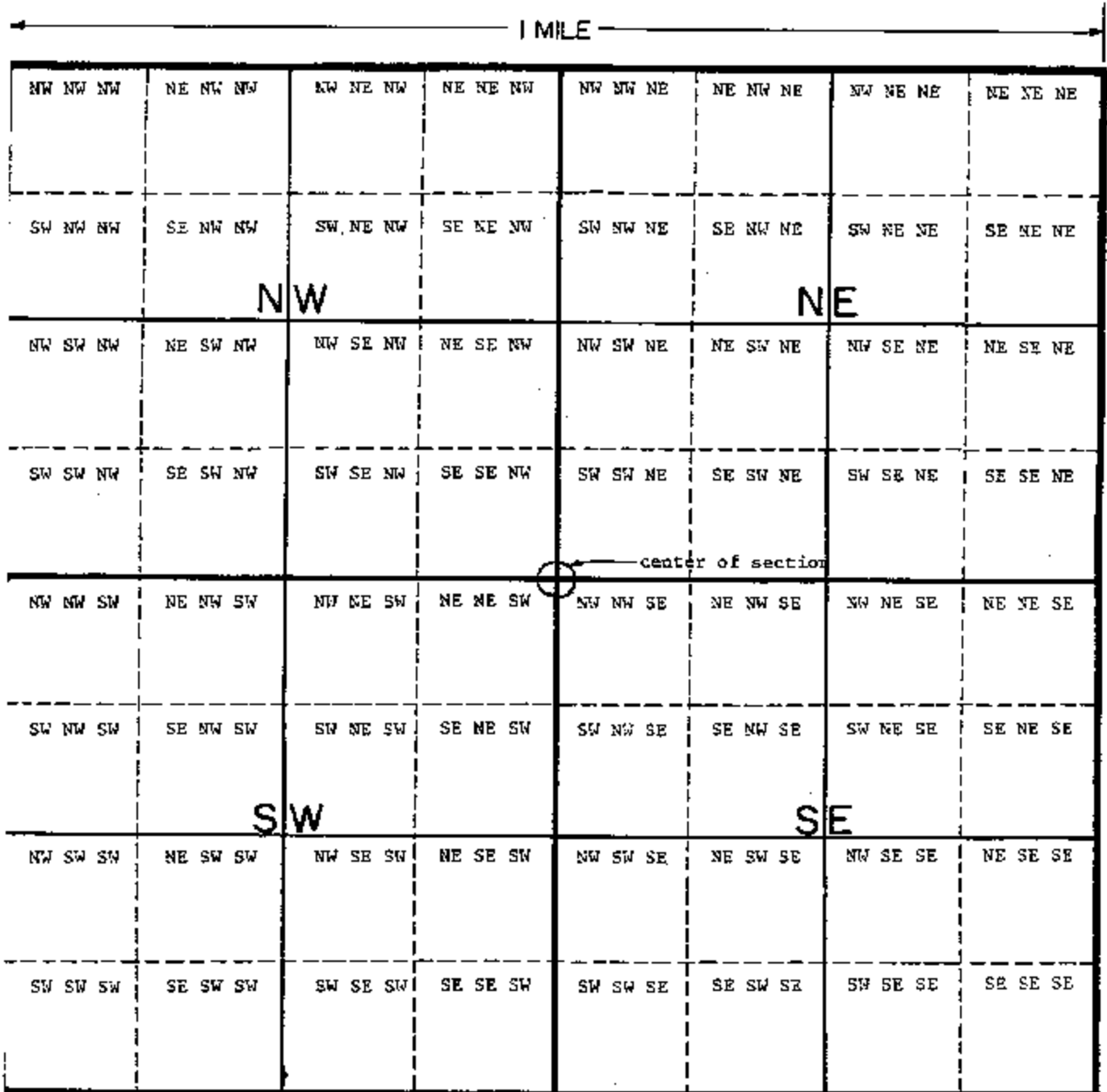
# GROUTING AN UNCONFINED WELL

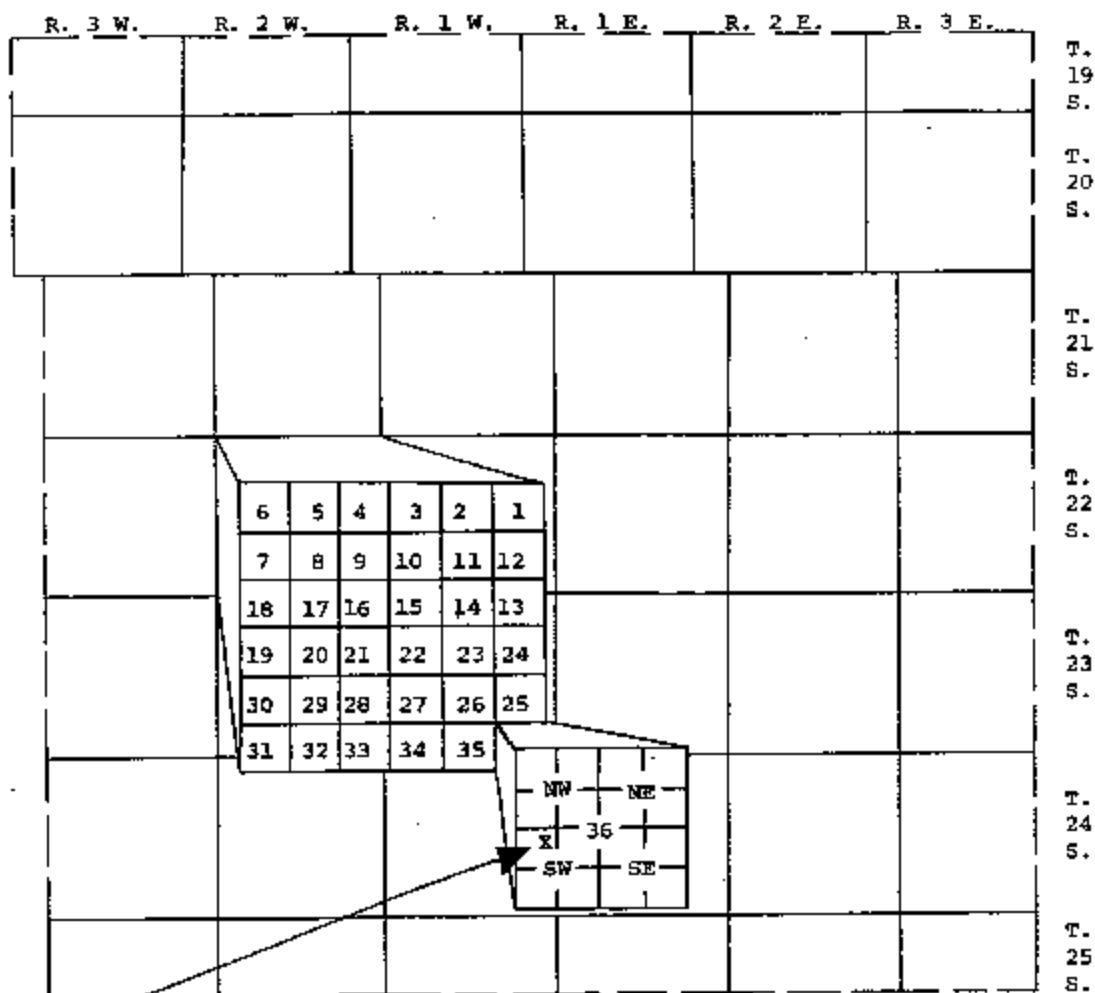


# GROUTING A CONFINED WELL



# LEGAL DESCRIPTION DIAGRAM



WATER WELL LOCATION DIAGRAM

1 Location of Well	County	Fraction	Section	Town #	Range #
	Harvey	NE $\frac{1}{4}$ NW $\frac{1}{4}$ SW $\frac{1}{4}$	36	T22S	R2W

The water well location description is found by starting with the smallest parcel of land and working towards the largest parcel of land.

EXAMPLE: (as above) (NE $\frac{1}{4}$  = 10 acres) (NW $\frac{1}{4}$  = 40 acres) (SW $\frac{1}{4}$  = 160 acres)

(Section 36 = 640 acres) (T22S & R2W = 36 sections = 1 township)

(County = many townships) (State = many counties)

## COMPUTERIZED WATER WELL RECORDS

### **Lithologic Names**

Clay	Red Bed (Shale)
Silt	Overburden (Clay)
Silty Clay	Bedrock (Shale)
Sandy Clay	Ocher (Shale)
Sand	Conglomerate (Sandstone)
Very Fine Sand	Dakota Clay (Sandstone)
Fine Sand	Sandstone and Clay (Sandstone)
Medium Sand	Red Rock (Shale)
Coarse Sand	Post Rock (Limestone)
Very Coarse Sand	Sand Rock (Sandstone)
Gravel	Soap Stone (Shale)
Very Fine Gravel	Limestone and Clay (Shale and Limestone)
Fine Gravel	Rock & Clay (Shale and Limestone)
Medium Gravel	Shale and Rock (Shale and Limestone)
Coarse Gravel	Shale and Clay (Shale)
Very Coarse Gravel	Hard Pam (Shale)
Sand and Gravel	Cresswell Lime
Boulder	Wellington Shale
Shale	Aluvium Sand
Limestone	Winfield Lime
Shale and Limestone	O'Dell Shale
Cherry Lime	Nolans Lime
Sandstone	Havensville Shale
Sand and Shale	Schroyer Lime
Dolomite	Wymore Shale
Cherty Dolomite	Kenny Lime
Coal	Blue Spring Shale
Rock	Florence Lime
Rock and Sand	Cottonwood Lime
Rock and Clay	Iron Stone
Caliche	
Flint	
Chert	
Pyrite	
Clay and Gravel	
Gyp Rock	

## Plugging Report

INSTRUCTIONS: Use hypo or ball point pen. PLEASE PRESS FIRMLY and PRINT clearly. Pledge fill in blanks, underline or circle the correct answers. Send top three copies to Kansas Department of Health and Environment, Bureau of Water, Topeka, Kansas 66602-0001. Telephone 786-236-6524. Send one to WATER WELL OWNER and retain one for your records. Fee of \$5.00 for each constructed well.

## SIGNIFICANCE OF WATER MINERALIZATION

THESE ARE ONLY SUGGESTED FOR PRIVATE WELLS

**Total Dissolved Solids:** The total dissolved solids is a measure in weight (mg/l) of the mineral matter dissolved in the water. This figure multiplied by 8.34 gives pounds of mineral matter per million gallons of water. The U.S. Public Health Service Drinking Water Standards recommend less than 500 mg/l total solids for drinking or culinary uses. If such water is not available 1000 mg/l will be considered satisfactory. The specific conductance (micromhos per centimeter) is a measure of the water's ability to conduct an electric current and is therefore an indication of the ionic strength, or mineralization of the water.

**Total Hardness:** The calcium ion and the magnesium ion cause the hardness of water and the sum of the two, both expressed as  $\text{CaCO}_3$ , is termed the total hardness. Hardness is undesirable in water in that it produces an insoluble sticky curd with soap and produces scaling in teakettles and hot water tanks. A total hardness above 400 mg/l as  $\text{CaCO}_3$  is considered excessive for public water supplies in Kansas. Hardness can be removed readily by the softening process.

**Sodium:** Sodium is not particularly significant physiologically except to those persons having an abnormal sodium metabolism and who are thus on a restricted sodium diet. It is important in irrigation waters because a high sodium to calcium-magnesium ratio tends to decrease the permeability of the soil and thus will have a harmful effect on soil structure. The base exchange or zeolite process of softening increases the sodium content of the water being softened. Limit 100 mg/l.

**Iron and Manganese:** Iron and manganese have little significance physiologically but they are undesirable in a public water supply because both will produce staining of laundered fabrics and porcelain plumbing fixtures and create consumer complaint. If present in an appreciable amount, iron gives the water a rusty turbid appearance and an unpleasant taste. Both substances create problems in the chlorination of water. The U.S.P.H.S. Drinking Water Standards recommend that iron be less than 0.3 mg/l and manganese less than 0.05 mg/l. Iron and manganese can be readily removed by treatment, particularly if lime-soda softening is also being practiced.

**Sulfate:** Sulfate is one of the principal mineralizing characteristics of water in Kansas and if present in large amounts it will impart a bitter taste to the water and it may act as a laxative to people who are not accustomed to drinking the water. The drinking water standards recommend that sulfate be less than 250 mg/l. Sulfate cannot be removed economically.

**Chloride:** Chloride is one of the principal mineralizing substances present in water in Kansas. When present in sufficient amount, chloride imparts a salty taste to the water but otherwise has little or no physiological significance when present in concentrations not offensive to taste. The drinking water standards recommend that chloride be less than 250 mg/l. Chloride cannot be removed economically.

**Nitrate:** Nitrate is important in drinking water because high concentrations may produce cyanosis or methemoglobinemia in infants. The recommended limit for public water supplies in Kansas is 10 mg/l nitrate (as N) when used for infants under one year of age. Older children and adults are not affected. Nitrate is also important in water to be used for livestock watering because excessive amounts may be harmful, particularly to young animals. Nitrate cannot be removed economically.

**Fluoride:** Fluoride is important in drinking water because in high concentration it may produce a mottling or discoloration of the tooth enamel of children and in low concentration it does not afford sufficient protection for the prevention of dental decay in children. A concentration of 10 mg/l fluoride is considered optimum for public water supplies in Kansas and a concentration of 1.5 mg/l fluoride is the recommended limit. It is recommended that fluoride be added to public water supplies when the concentration is substantially less than the optimum.

**Phosphate:** Total phosphate represents all forms of phosphate in water including polyphosphates used in the treatment of water. Phosphate in water has little physiological significance but it does stimulate the growth of algae and thus may cause water treatment problems. If a poly-phosphate is being fed to stabilize iron, it is recommended that the feed rate be limited to 3 mg/l phosphate per 1 mg/l iron.

- .....
- ★ mg/l = milligrams per liter
  - ★ One gallon weighs 8.34 pounds
  - ★ 1 mg/l = 8.34 lbs. Per million gallons
  - ★ 17.1 mg/l = 1 grain per gallon
  - ★ To obtain results in grains per gallon, divide results in milligrams per liter by 17.1
  - ★ Reacting values are in terms of milligram equivalents per liter

**DISINFECTION TABLE TO DISINFECT THE WELL WATER**  
(Produces a 100 mg/liter chlorine solution per-foot of casing size)

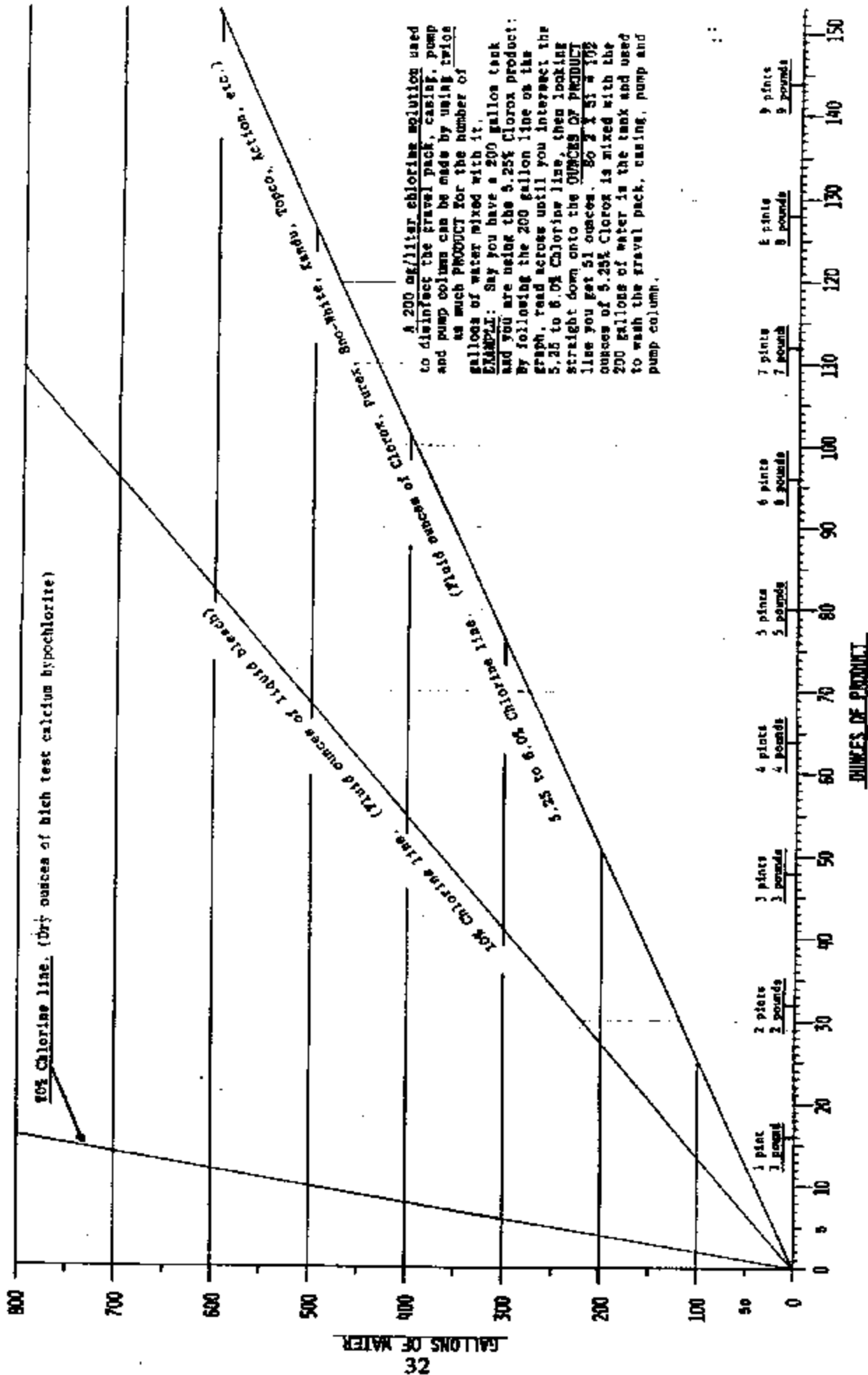
Casing Size Nominal diameter  (inches)	Gallons of Water per One Foot of Casing Size  (gal/ft/casing size)	Ounces of Product Added to Disinfect One (1) Foot of Water per Casing Size		
		5.25% to 6.0% Chlorine Product: Clorox, Purex, Sno- White, Kandu, Topco, Action, White Magic, Surefine and MC <sub>2</sub> or other brand names. (sodium hypochlorite)	10% Chlorine Product: Liquid Bleach, Purchased from a chemical supply company. (sodium hypochlorite)	70% Chlorine Product: High test Calcium Hypochlorite. Purchased from a chemical supply com- pany. (calcium hypochlorite)
1.25	0.06	(fluid ounces) 0.015	(fluid ounces) 0.008	(dry ounces) 0.0011
1.50	0.09	0.023	0.012	0.0017
2	0.16	0.041	0.021	0.0031
2.5	0.25	0.064	0.033	0.0048
3	0.37	0.094	0.049	0.0071
3.5	0.50	0.127	0.067	0.0095
4	0.65	0.165	0.087	0.0124
5	1.02	0.259	0.136	0.0194
6	1.50	0.391	0.200	0.0286
8	2.60	0.660	0.347	0.0495
10	4.08	1.036	0.544	0.0777
12	5.87	1.490	0.782	0.1118
14	8.00	2.031	1.066	0.1523
16	10.44	2.650	1.391	0.1988
18	13.21	3.354	1.761	0.2515
24	23.50	5.966	3.132	0.4474
30	36.70	9.317	4.891	0.6988

1. **FORMULA TO FIND HEIGHT OF WATER COLUMN:** (total depth of water well) - (measured static water level) = (height of water column)  
**EXAMPLE:** (216 feet depth of well) - (37 feet static water level) = (179 feet of water column)

2. **FORMULA TO FIND NUMBER OF OUNCES USED TO DISINFECT THE WELL WATER:** (height of water column) X (ounces of product added to disinfect one (1) foot of water per casing size) = (ounces of product needed to be placed and mixed with the water in the well)  
**EXAMPLE:** For a 5 inch casing using 5.25% Clorox Product: (179 feet) X (0.259) = (46.36 fluid ounces)  
 Which is approximately 3 pints of Clorox placed down the well and mixed with the well water by surging and left standing in the well for 8-10 hours to properly disinfect the well water.

3. **FORMULA TO FIND NUMBER OF GALLONS INSIDE THE CASING:** (gallons of water per one (1) foot of casing size) X (height of water column) = (gallons of water inside the casing)  
**EXAMPLE:** For 5 inch casing: (1.02) X (179) = (183 gallons)

# **DISINFECTION GRAPH TO DISINFECT THE WELL WATER** (PRODUCES A 100 MG/LITER CHLORINE SOLUTION WHEN MIXED WITH THE NUMBER OF GALLONS OF WATER)



A 200 mg/liter chlorine solution used to disinfect the gravel pack, casing, pump and pump column can be made by using twice as much PRODUCT for the number of gallons of water mixed with it.

**EXAMPLE:** Say you have a 200 gallon tank and you are using the 5.25% Chlorox product: By following the 200 gallon line on the graph, read across until you intersect the 5.25 to 6.0% Chlorine line, then looking straight down onto the OUNCES OF PRODUCT line you get 51 ounces. 50 2 1/2 51 + 102 ounces of 5.25% Chlorox is mixed with the 200 gallons of water in the tank and used to wash the gravel pack, casing, pump and pump column.

NOTE: 1 PINT = 16 FLUID OUNCES  
1 POUND = 16 DRY OUNCES



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## Purpose of the Section:

The Public Water Supply Section (PWSS) of the Kansas Department of Health and Environment's Bureau of Water is charged with regulating all public water supply systems in the state and assisting them in providing safe and potable water to the people of Kansas. The PWSS oversees more than 1,100 public water supply systems including municipalities, rural water districts, and privately owned systems. These systems may serve a small community of several families to a city

of more than 300,000 persons.

**What is a public water supply system?**

In the State of Kansas, a public water supply system is defined by Kansas Statutes Annotated (K.S.A.) 65-162a and Kansas Administrative Regulations (K.A.R.) 28-15-11(a) as a "system for delivery to the public of piped water for human consumption that has at least 10 service connections or regularly serves at least 25 individuals daily at least 60 days out of the year." These systems are regulated by the state to assure the citizenry safe and pathogen-free drinking water. Private domestic/residential groundwater wells are not considered a public water supply systems and are not regulated by the PWSS.

**How does the PWSS regulate public water supply systems?**

To maintain a high degree of water quality, the PWSS has set up two units to develop and implemented several regulatory programs. These two units are: The Permits and Engineering Unit and The Data Management and Compliance Unit.

## Related Links

- [KDHE Environmental Microbiology Lab](#)-Monitors Kansas public water supplies to ensure health and safety.
- [Midwest Assistance Program \(MAP\)](#)-The Midwest Assistance Program is dedicated to helping rural communities improve their environment, quality of life and be self-sustaining.
- [American Water Works Association \(AWWA\)](#)-The American Water Works Association (AWWA) is an international nonprofit scientific and educational society dedicated to the improvement of drinking water quality and supply.
- [Kansas Rural Water Association](#)-The Kansas Rural Water Association provides leadership and educational opportunities to help its more than 650 municipal and rural water district members and other professionals wisely manage water and wastewater resources.
- [Kansas Water Office](#)-Lead office for the Governor's Water Quality Initiative.
- [Dickinson County Water Improvement Program](#)-A cooperative effort of Dickinson County, Ks., the City of Abilene, Ks., the Dickinson County Conservation District, the Kansas Department of Health & Environment, and the Natural Resources Conservation Service to reduce nitrate levels in the Sand Springs Aquifer.
- [U.S. EPA Office of Water](#)
- [U.S. EPA Region 7 Home Page \(Iowa, Kansas, Missouri, Nebraska\)](#)
- [U.S. EPA National Home Page](#)

# **KANSAS DEPARTMENT OF HEALTH AND ENVIRONMENT**



## **POLICIES, GENERAL CONSIDERATIONS AND DESIGN REQUIREMENTS FOR PUBLIC WATER SUPPLY SYSTEMS IN KANSAS**

**STATE OF KANSAS  
DEPARTMENT OF HEALTH AND ENVIRONMENT  
DIVISION OF ENVIRONMENT  
BUREAU OF WATER  
PUBLIC WATER SUPPLY SECTION**

**1995**

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*This highlighted and underlined information is pertinent to the Water Well contractors study guide.*

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8.	Polyphosphates . . . . .	IX-21
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## BIBLIOGRAPHY

APPENDIX A	Listing of Selected Kansas Statutes and Regulations Pertaining to Public Water Supply
APPENDIX B	Water Quality Testing for New Public Water Supply Sources
APPENDIX C	Procedures for Pressure and Leakage Testing of Mains
APPENDIX D	Water Main Disinfection Procedures

## ACRONYMS AND ABBREVIATIONS

Commonly used acronyms and abbreviations are listed for the design bulletin to facilitate brevity where appropriate.

<u>Abbreviation</u>	<u>Meaning</u>
APHA	American Public Health Association
ASAP	As Soon As Possible
ASCE	American Society of Civil Engineers
ASME	American Society of Mechanical Engineers
ASTM	American Society of Testing and Materials
AWWA	American Water Works Association
BAT	Best Available Technology
BOR	Bureau of Reclamation
CFR	Code of Federal Regulations
COE	Corps of Engineers
CT	Concentration-Time Product
DAF	Dissolved Air Flotation
DBP	Disinfection By-Products
DWR	Division of Water Resources
DOT	Department of Transportation
G	Velocity Gradient
GAC	Granular Activated Carbon
GWUI	Groundwater Under the Direct Influence of Surface Water
HPC	Heterotrophic Plate Count
IOC	Inorganic Chemicals
KAR	Kansas Administrative Regulation
KBS	Kansas Biology Survey
KDHE	Kansas Department of Health and Environment
KDWP	Kansas Department of Wildlife and Parks
KGS	Kansas Geological Survey
KSA	Kansas Statutes Annotated
KWO	Kansas Water Office

KWRRI	Kansas Water Resources Research Institute
MCL	Maximum Contaminant Level
NRCS	Natural Resources Conservation Service (Formerly, Soil Conservation Service)
NTU	Nephelometer Turbidity Unit
NA	Not Available or Not Applicable
NIOSH	National Institute of Occupational Safety and Health
NPSH	Net Positive Suction Head
NSF	National Sanitation Foundation
OD	Outside Diameter
O&M	Operation and Maintenance
OSHA	Occupational, Safety, and Health Act
PA	Permit Application
PAC	Powdered Activated Carbon
PDWS	Primary Drinking Water Standards
POE	Point of Entry
POU	Point of Use
P&S	Plans and Specifications
PVC	Polyvinyl Chloride
PWS	Public Water Supply
PWSS	Public Water Supply System (s)
RWD	Rural Water District (s)
SCC	State Conservation Commission
SDWA	Safe Drinking Water Act
SMCL	Secondary Maximum
SOC	Synthetic Organic Compounds
SWTR	Surface Water Treatment Rule
T&O	Taste and Odor
THM	Trihalomethanes
USC	University of Southern California
USEPA	United States Environmental Protection Agency
VOC	Volatile Organic Compounds
WEF	Water Environment Foundation

## Measurements

The abbreviations used for units of measurements are based upon a list of U.S. customary units and the units specified for the International System (SI) by AWWA\*. These include:

<u>Measurement</u>	<u>U.S.</u>	<u>S.I.</u>
Linear	inch (in), foot (ft)	meter (m)
Area	square inch (in <sup>2</sup> ), square foot (ft <sup>2</sup> ), acre (ac), and square mile (mi <sup>2</sup> )	square (m <sup>2</sup> ) and hectare (ha)
Time	second (sec), minute (min), hour (h), and day (d)	second (s), minute (min), hour (hr), and day (d)
Velocity	feet per second (ft/sec)	meters/sec (m/s)
Volume	gallon (gal) and million gallons (MG)	cubic meters (m <sup>3</sup> ) and liters (L)
Weight	ounce (oz) and pound (lb)	gram (g)
Other Combined Units		
	gallons per minute (gpm)	liters per minute (L/m)
	million gallons per day (mgd)	cubic meters per day (m <sup>3</sup> /d)
	acre-feet (ac-ft)	cubic meter (m <sup>3</sup> )
	inches per foot (ipf)	meter per meter (m/m)

	pound-mass per cubic foot (lb/ft <sup>3</sup> )	grams per liter (G/L)
	pounds-force per square inch (psi)	pascals (Pa)
Power	horsepower (HP)	Watts (w)
Temperature	Centigrade (°C) Fahrenheit (°F)	Celsius (C)

Preferred SI multiples included:

	Prefix	Symbol
1000000000 = 10 <sup>9</sup>	giga	G
1000000 = 10 <sup>6</sup>	mega	M
1000 = 10 <sup>3</sup>	kilo	k
0.001 = 10 <sup>-3</sup>	milli	m
0.000001 = 10 <sup>-6</sup>	micro	u
0.000000001 = 10 <sup>-9</sup>	nano	n

\*Source: AWWA Committee Report, "Final Report on Metric Units and Sizes," JAWWA, Volume 74, No. 1, pgs. 27-33, 1982.

## **CHAPTER I**

### **INTRODUCTION**

## **A. HISTORY AND PRESENT SITUATION**

The history of the development of bulletins dealing with policies governing the design of PWSSs in Kansas was reviewed in 1984 (1). The most recent bulletin was published in 1984 (2). Earlier versions were published in 1953, 1957, and 1967.

The 1986 Amendments to the federal Safe Drinking Water Act created a whole new set of constraints for the design engineer. KDHE decided to revise the bulletin due to concerns about incorporating new technology and the obsolescence of portions of its design criteria.

## **B. STATUTORY AUTHORITY AND CHARGE**

KSA65-171h authorizes and empowers the Secretary of KDHE “to develop, assemble, compile, approve and publish minimum standards of design, construction, and maintenance of sanitary water and sewage” and further state that the Secretary shall “publish and make available such approved minimum standards to municipalities, communities and citizens of this state.” KSA 65-162a (b) defines a public water supply system as “a system for the provision to the public piped water for human consumption, if such system has at least ten (10) service connections or regularly serves an average of at least twenty-five (25) individuals daily at least sixty (60) days out of the years. Such terms include any source, treatment, storage, or distribution facilities.”

Public water systems can be publicly or privately owned and are subdivided for regulatory purposes into two major categories: community and non-community system. KAR 28-15-11 defines a non-community water supply system as one which is not a community water supply system or one that serves water to non-resident populations. Non-community water systems are further divided into non-transient non-community systems (serves the same non-resident population such as schools and factories) and transient non-community (serves a different non-resident population such as highway rest-stops, restaurants, and motels). KAR 25-15-11 defines a non-transient non-community water supply system as one that is not a community water supply system and that regularly serves at least 25 of the same persons over six months per year.

## **C. PURPOSE AND INTENT**

The purpose of this bulletin is to identify KDHE policies and criteria (guidelines and standards) for the design of Kansas PWSSs by water supply professionals. It is KDHE’s intent that the bulleting will allow designers maximum freedom consistent with modern water supply practices. The policy statements are derived from state statutes and regulations which reflect KDHE’s responsibilities to users of water produced in Kansas PWSSs.

The design criteria stated herein consists mainly of principles and requirements which have been in use over a long period of time in water supplies found in the State of Kansas. Their purpose is to provide guidelines and standards to those engaged on the design of new facilities and the upgrading of existing public water supply systems. The precise formulation of many of the principles and requirements in this bulletin were derived from Recommended Standards for Water Works - Policies for the Review and Approval of Plans and Specifications for Public Water Supplies, a report of the committee of the Great Lakes - Upper Mississippi River Board of State Public Health and Environmental Managers (1992 Edition) commonly referred to as the "Ten State Standards" (3). Also, there are numerous references to specific standards developed by the AWWA (4). All references in this bulletin to specific AWWA standards are to the most current version of the referenced standard.

It is intended that designers using the criteria in this bulletin retain a maximum degree of design freedom since it is recognized that each water supply system is a unique entity and that certain changes to these criteria may be necessary to meet local conditions and unusual circumstances. Terms such as "should" or "recommended" indicate desirable guidelines with deviations subject to site specific considerations. On the other hand, the terms "shall" and "must" are used where practice is standardized to permit specific delineation of requirements or where safeguarding of the public health justifies definite action. Even the terms "shall" and "must" are not absolutes in that KDHE may grant an exception to these requirements under certain circumstances. Also, it is not possible to include design criteria for recently developed processes, methods, chemicals, and equipment although these developments may be acceptable to KDHE.

#### **D. ORGANIZATION AND USE**

This bulletin covers administrative procedures and general design considerations along with a review of specific design guidelines and standards. Future revisions will be made by providing dated, loose-leaf corrections and supplements to bulletin users.

Chapter I and II include an introduction to the design bulletin, Kansas statutes, regulations, procedures, required reports, and plans and specifications for PWSS projects. This portion of the bulletin is intended to provide project managers and engineers with an awareness and an understanding of the administrative aspects of a PWSS project. Chapters IV through VIII include the recommended and required design criteria for each phase of a PWSS. These are source development, treatment, storage, pumping, and distribution. General facility considerations (Chapter III) are included in the bulletin as a prelude to the design chapters and the bulletin concludes with consideration of chemical storage, handling and applications' requirements (Chapter IX). Detailed material addressing specific subject areas are included in the appendices to this bulletin.

The use of the following administrative procedures and design criteria will be most effective when implemented by a licensed professional engineer experienced in water works design. Further, subject to certain limited exceptions, KSA 74-7001 et seq requires the use of licensed professional engineers for services or work constituting the practice of engineering. Therefore, KDHE strongly recommends that a water supplier contract with a licensed professional to assist them in preparing P&S for any anticipated project. Any attempt to avoid their use may compromise the technical requirements of the PWSS design and may result in less than adequate facilities.

#### **E. LAWS AND REGULATIONS**

A listing of titles to selected Kansas statutes and regulations pertaining to PWSSs are provided in Appendix A. Regulations are identified under their specific governing statute. Copies of current statutes and regulations pertaining to PWSSs may be obtained from KDHE.

#### **F. OTHER RESOURCES**

This bulletin will reference other resources which are related to the specific subject matter within the bulletin and which are generally available from state agencies dealing with these concerns. It should be recognized that most of these agencies have compiled lists of publications which may be obtained and used to identify additional information about cities, policies, reviews, strategies, surveys, water resources, etc., eg, KGS has a Catalogue of Publications (5) which includes a listing of several water related resources such as maps, data bases, computer programs, and various reports. In addition, AWWA distributes annually a Publications Catalogue that includes publications covering numerous aspects of the design of water treatment and distribution systems (6). Also, two major references are available on water treatment plant design (7,8).

## **CHAPTER II**

### **REPORTS, PLANS, AND SPECIFICATIONS**

## **A. PROCEDURES FOR WATER SUPPLY PROJECT APPROVAL**

The following KDHE review procedure is designed to facilitate the efficient processing of PWSS projects as required by KSA 65-163. Table 1 summarizes the basic steps leading to KDHE approval, especially as they relate to design engineer. The tasks are common to all water supply projects with at few exceptions. These deviations are identified and discussed following the general procedure for water supply project approval.

### **1. APPROVAL STEPS**

- a. **PRELIMINARY REPORT PREPARATION (TASK 1)** - The preparation of a preliminary report by the engineer for the client outlines the alternatives that exist for public water supply improvements and extensions. The client uses the report to make an assessment of possible actions and as a basis for directing the engineer to continue the investigation. The items covered in the report are similar to those required for the engineer's report.
- b. **ENGINEER'S REPORT PREPARATION AND SUBMISSION (TASK 2)**  
- The engineer's report consists of the details necessary to establish the proposed project design. KDHE approval of the engineers's report is not required but a copy must be submitted so that preparations can be made for the design concepts conference.
- c. **DESIGN CONFERENCE (TASK 3)** - A meeting is held with KDHE to establish the design concepts to be incorporated in the final design of the PWSS. KDHE is concerned primarily about the functional and sanitary features of the design; hence, the meeting is used to insure that the design engineer understands these requirements for the proposed design. KDHE will notify the engineer in writing about the acceptability of the proposed design.
- d. **PLANS AND SPECIFICATION/PERMIT APPLICATION SUBMISSION (TASK 4)** - The preparation of plans and specifications by engineer must be based on the previously approved design approach. Also, KDHE has the authority to require a design revision if new information has developed since the design concepts meeting. Deviations from the engineer's report must be identified and substantiated. The plans and specification must be submitted to KDHE along with a notarized Public Water Supply Permit Application signed by the mayor, RWD board chairman, city manager or an official of the PWSS authorized to do business for the PWSS. The information in the permit

application may be taken from the engineer's report or the plans and specifications. KDHE approval of the plans and specifications and the permit application may require several weeks after the required submittals, depending on the complexity of the project.

The project engineer must be cognizant of the need to submit plans, specifications, or other documentation to agencies or organizations other than KDHE. For example, KSA 82a-621 requires plans, specifications, proposed operating budget and other specified documentation relating to the design and operation of a new rural water district must be followed with the chief engineer of DWR.

- e. INITIATION OF CONSTRUCTION (TASK 5) - After KDHE approves the plans and specifications and the permit application, bids can be solicited and the construction contract let. Delays in the initiation of construction over 2 years after approval will require resubmittal of the P&S and permit application.
- f. NOTIFICATION, INSPECTION, AND APPROVAL (TASK 6 ) - As soon as the functional and sanitary capabilities of the water system are constructed and operational, the engineer must notify KDHE by letter so that a post construction inspection can be made. If the construction is found to be in accord with the approved plans and specifications, KDHE will issue a permit to the public supplier and inform the engineer of the project's final approval.

**Table 1**

**OUTLINE OF PUBLIC WATER SUPPLY PROJECT (GENERAL) PROCEDURE**

<b>Task No.</b>	<b>Engineer's Task Description</b>	<b>Timing for Engineer</b>	<b>Action Required By KDHE</b>	<b>Timing for KDHE</b>
1	Preparation of preliminary report	None	None	None
2	Preparation and submission of engineer's report	Within 1 year after completion of Task #1	Comments optional	None
3	Design concepts conference involving engineer and KDHE	None	Approval in writing	ASAP after meeting
4	Preparation and submission of plans and specifications	Within 1 year after completion of Task #3	Approval in writing of P/S, P/A, and for initiation of construction procedure	ASAP after submission
5	Initiation of construction steps	Within 2 years after completion of Task #4	None	None
6	Notification of completion by engineer	ASAP after completion of construction	Post construction inspection and issuance of permit	ASAP after notification  ASAP after inspection

2. SCOPE OF REVIEW - Task 3 in obtaining approval of a public water supply project identifies KDHE's primary design concerns as the functional and sanitary features. This means that the engineer's report and plans/specifications will be reviewed in these areas. "Functional" refers to the ability of a design to provide the required water quantity and accomplish the desired water quality changes. "Sanitary" concerns reflect the public and operator health aspects of the proposed design.
3. DEVIATIONS/MODIFICATIONS TO KDHE STANDARD APPROVAL PROCEDURE
  - a. **WATER MAIN EXTENSIONS** - Task 1 through 3 of Table 1 will not be required for water main extensions unless specifically directed by KDHE or otherwise required by the funding source for the project. Water main extensions will not receive a post construction inspection by KDHE. Further, a water supply permit will not be issued for water main extensions less than 1 mile in total length and permit applications need not be completed for such projects. However, preparation and submission of plans and specifications are required for all water main extensions.
  - b. **MINOR ADDITIONS/MODIFICATIONS TO PROCESSES** - Tasks 1 through 3 of table 1 will not be required for minor additions or modifications to treatment process unless specifically directed by KDHE or otherwise required by the funding source of the project. The engineer should contact the Chief of Plans and Permits of the Public Water Supply Section, KDHE, for specific clarification on whether an engineering report is necessary. It is anticipated that in lieu of Task 3, a teleconference will be sufficient for most projects if KDHE has questions or comments concerning a project.
  - c. **NEW WELLS** - Tasks 1 through 3 of Table 1 will not be required for new well construction unless specifically directed by KDHE or otherwise required by the funding source for this project. However, additional information must be submitted which is described in part B.,3 of this chapter including documentation of the absence of pollution sources and water quality sampling results. This material shall be submitted along with the plans and specifications and permit application as discussed in Task 4. KDHE approval is required before new well construction can begin.

## **B. DOCUMENTATION REQUIREMENTS FOR WATER SUPPLY APPROVAL**

Task 1, 2, and part of 4 of the approval procedure consist of the preparation of a preliminary report, and engineer's report, and plans and specification. Tasks 1 and 2 serve different purposes but share similar coverage since comprehensive view of the water supply situation is required. Task 4 uses the information derived in the report preparation steps to allow the completion of the project plans and specifications (and also the Public Water Supply Permit Application). The following listings summarize the information generally necessary to establish the proposed design (preliminary and engineer's report) and the specific requirements (plans and specifications) for its construction. Detailed design information for these outlined items are presented in Chapter V.

1. PRELIMINARY AND ENGINEER'S REPORT - The preliminary report (Task 1) is preliminary in that it is the client's first formal look at the project alternatives as proposed by the engineer. It differs from the engineer's report (Task 2) in its limited detail and the still tentative recommendations. The engineer's report represents the final assessment of the water supply project alternatives prior to seeking approval from KDHE.

This report includes a detailed review of existing water situation along with data and considerations used to establish the proposed design. Alternative proposals are compared so that the relative merits of each are apparent. Cost analyses are made to justify the proposed design and include estimates of the capital and O&M cost along with the recommended method of financing. Recommended coverage for the preliminary and engineer's reports include the various topics reviewed in the design guidelines and standards section; especially the items discussed in Chapter V.

2. PLANS AND SPECIFICATIONS (GENERAL) - The inclusion of all pertinent construction information must be contained in the plans and/or the specifications. The following outline summarizes the recommended location for such information where applicable. Another accepted format is the system proposed by the Construction Specifications Institute where a standardized format is used to facilitate the preparation and review of plans and specifications.

- a. **PLANS AND GENERAL REQUIREMENTS**

- 1) Suitable title
- 2) Scale

- 3) North point
- 4) Datum used
- 5) Name of legal entity or responsible person
- 6) Area of entity to be served
- 7) Name and address of design engineers
- 8) Imprint and date of placement of engineers seal
- 9) Legible prints suitable for reproduction

b. **PLANS-PROJECT DESIGN REQUIREMENTS**

- 1) Summary of major facilities proposed sizes and design criteria.
- 2) Summary of existing facilities sizes and know design criteria and yield.
- 3) Location and nature of existing facilities affecting or having a relationship to the proposed improvements.
- 4) Boundaries of area to be served.
- 5) Relative locations of existing and proposed:
  - a) Water mains length and sizes
  - b) Sewers and drains with sizes relative to water main locations.
  - c) Other sources of pollution.
  - d) Chemical feeding equipment and points of application.
  - e) Sampling taps.
- 6) Locations, dimensions, and elevations of proposed facilities.

- 7) Schematic flow diagrams and hydraulic profiles through plant.
  - 8) Piping details for plant flow schemes.
  - 9) Known flood elevations relative to facilities.
  - 10) Topography and arrangement of facilities.
  - 11) Stream crossing with bed elevations and water profiles for low, normal and flood flows.
  - 12) Drawings for well construction.
  - 13) Description of features or facilities not covered by specifications.
- c. SPECIFICATIONS - Complete and detailed specifications shall be supplied for the proposed project including:
- 1) A program for keeping existing water works facilities in operation during construction.
  - 2) Laboratory facilities and equipment.
  - 3) The number and design of chemical feeding equipment.
  - 4) Materials or proprietary equipment for sanitary or other facilities including any necessary backflow or back-siphonage protection.

### **3. DOCUMENTATION REQUIREMENTS FOR NEW WELLS**

**The following documentation, in addition to a public water supply permit application, should be provided for all new wells:**

- a. **LOCATION DETAILS - A plan or sketch showing the location of the proposed water supply well with respect to roads, houses, wells, and potential sources of pollution such as sewer lines, privies, cesspools, septic tanks, lateral fields, animal feedlots, and underground storage tanks or pipes for petroleum products or chemicals. In addition, the location of the test well (s) which were relied on in locating and**

designing the proposed water supply well should be clearly indicated on the drawing.

- b. WELL DETAILS - A plan or sketch showing the type of well construction to be used. Items to be shown include: depth and diameter of the drill hole, type of material, diameter, weight and thickness of the casing, the well screen, the gravel pack, the thickness and depth of the grout, the extension of the well casing above the existing ground level, the 100 year flood level or the highest known flood level at least the well location, the well vent, the drawdown gauge, the discharge line including the meter, the check and gate valves, the pump motor and pedestal for a vertical turbine installation, the sanitary well seal in the case of above ground discharge for a submersible turbine pump, or the pitless unit in the case of below ground discharge for submersible pump, the chlorination equipment, point of chlorine application, the sampling tap and the well house. In addition, the lithologic log (s) and formation sampling results from the test well (s) which were relied on in locating and designing the proposed water supply well should be submitted to KDHE along with any hydrologic data from preliminary pump tests.
- c. WATER LINE DETAILS - A sketch showing the connection of the water line from the proposed well to the distribution system. In addition, provide details of the pipe diameter, material, depth of burial, details of trenching and backfilling, specifications for the separation of the water line from pollution sources, and pressure testing and disinfection procedures to be used in the construction of the water line.
- d. DOCUMENTATION OF ABSENCE OF POLLUTION SOURCES - Documentation by easement or letter that no potential sources of pollution will be allowed within 100 feet (30 m) of the well as described more fully in Chapter IV.
- e. WATER SAMPLING - Analytical results of water samples collected from the aquifer on which the well is to be completed as described in part B.4. of this chapter and Appendix B.

**4. WATER SAMPLING REQUIREMENTS FOR NEW SOURCES (SURFACE)  
WATER AND WELLS**

**KAR 28-15-16 (e) requires new water supply sources be sampled and analyzed for certain chemical and radiological constituents. Required analytical parameters for monitoring new sources are presented in Appendix B along with recommended sampling procedures. Analytical results must be submitted to KDHE in addition to the plans, specifications, and permit application before final approval will be granted.**

**CHAPTER IV**  
**SOURCE DEVELOPMENT**

In selecting a source of water to be developed, the design engineer must determine that an adequate quantity of water exists for which a vested water right or permit to appropriate can be lawfully obtained and that the water which is to be delivered to the consumers will meet KDHE's PWS quality standards.

**A. QUANTITY REQUIREMENTS**

**The quantity of water at the source shall be adequate to meet the projected maximum daily demand for the design period. Rights to the water must be obtained from DWR, which administers the Kansas Water Appropriation Act. A potential water user must make application to DWR in order to begin the process necessary to establish a water right (15). The time period for processing and application for a permit by DWR may be substantial. Processing time of one year or more is not unusual. Assistance in completing an application can be obtained from any of the DWR field offices. The DWR considers a water use projection for twenty years reasonable for determining the requested quantity of water on application to appropriate for municipal water supply use.**

**It is illegal for a PWSS in Kansas to use water without holding a vested right or applying for and receiving a permit to appropriate water. Also, it is important to recognize that some parts of Kansas have no water available for new permits. In those areas, acquisition of an existing water right and obtaining approval to change one or more of the water right's features may be the only way to meet future water needs. Features associated with an existing water right that must not be changed without DWR approval include the type of water use, the point of diversion (e.g. location of intake structure in a reservoir, stream, or river), or the place of water use. An acceptable meter must be installed on each diversion works in accordance with DWR's specifications and maintained in a satisfactory condition and used to provide use information required on the annual water use report.**

Yield restriction for the various water resources area as follows:

1. **FLOWING SOURCES** - Where water is drawn from a flowing stream, river, or spring, DWR flow records should confirm its availability to meet the maximum daily demand for the design period during a 50 year drought with all prior water rights considered. The occurrence of a 100 year flood should not impair the proposed PWSS facilities.
2. **IMPOUNDMENTS** - Reservoirs and lakes used for PWS must meet the drought and flood restrictions of flowing streams. The effective storage needed to provide the firm yield shall take into account evaporation, seepage, and siltation losses. KWO handles

requests for water from federal reservoirs through their water marketing program.

Also, DWR must approve all plans for construction of dams which impound more than 30 - acre ft (37,000 m<sup>3</sup>).

- 3. WELLS - Proposed well installations should be based on pumping test and/or historical records of withdrawal where available. Rights for withdrawal of groundwater must be obtained from DWR similar to the procedure for surface waters (15). DWR is assisted by Groundwater Management in western and south central Kansas. Together they work to formulate and enforce local policies concerning the conservation, management, and control of water within each district.**

## **B. QUALITY REQUIREMENTS**

The quality of the proposed water resource should be determined for both average and extreme conditions of flow and climate. Major sources of historical water quality data are available from the Kansas Water Data Base and STORET maintained by KDHE and EPA, respectively. In addition, KDHE requires that current water quality test results be submitted with permit applications for new sources (see Appendix B). The quality of a particular water resource must be compared with PWS water quality requirements are contained in KAR 28-15-13, "Standards for bacteriological, chemical, physical, and radiological quality". Additional treatment requirements are specified in KAR 28-15-19, "Disinfection of drinking water", and KAR 28-15-21, "Surface water treatment rule". The designer must consider the worst conditions that may exist during the life of the facility.

## **C. SURFACE WATER - RESOURCE FACILITIES AND OTHER REQUIREMENTS**

Surface water includes streams, rivers, impoundments, reservoirs, or other natural or man-made surface water sources. It can also include from a regulatory standpoint GWUI (see Chapter V, Section M on Disinfection). In this discussion, springs are considered surface water sources while all types of wells are considered groundwater sources even though they may be regulated as GWUI.

the inlet line. Conduit velocities should be 3 to 4 ft/sec (0.9 to 1.2 m/s) to avoid deposition of solids. Straight lines on a rising or falling grade should be used to avoid air accumulation. If this is not possible, air release provisions must be provided at the high points.

- g. Shore shafts or pump wet wells provide storage for intake water at the design flow and minimum head conditions, adequate pump submergence, and surge capacity in the event of power failure. Fixed and traveling screens can be located in the shore shaft. Motors and electrical controls should be located above grade and protected from flooding. The shafts should be accessible, designed against flotation, have chemical addition points if necessary, valves for cleaning, test of leaks, and backflushing where practical.
7. OFF - CHANNEL RESERVOIRS - This is a facility into which water is diverted during periods of high stream flow for future release to treatment facilities (or for low augmentation). Off-channel reservoirs shall be constructed to assure that the water quality is protected by controlling runoff into the reservoir, dikes are structurally sound and protected against wind action and erosion, and the point of influent flow is separated from the point of withdrawal.

**D. GROUNDWATER - RESOURCE FACILITIES AND OTHER REQUIREMENTS**

**Groundwater sources include water from drilled, bored, or driven wells and infiltration lines, which are not under the direct influence of a surface water. Drilled wells are preferred. Springs are considered surface water sources (see part C. of this chapter). Sources most likely to be under the direct influence of surface waters (GWUI), include infiltrations lines, radial water collectors, and shallow wells with screen openings less than 50 ft (15.2 m) deep located within 200 ft (61 m) of a surface water. Under the SWTR, all GWUI must be treated like surface water (see Chapter V, Section M on Disinfection).**

**All water obtained from wells shall be disinfected and filtration may be needed (see Chapter V, Section M on Disinfection). The extent of water treatment required will be determined on the basis of geological data, well construction features, nearby sources of contamination, laboratory analysis, and MCLs. Where a well draws water from creviced limestone strata and it is evident that the limestone supply is contaminated, use of this supply cannot be considered satisfactory unless it is properly treated by clarification and the elimination of harmful contaminants.**

1. **SANITARY SURVEYS - By means of a sanitary survey, the PWSS evaluates the potential threat to a proposed well presented by nearby sources of contamination. This allow the PWSS to estimate costs to reduce or contain threats to the proposed well by contaminant sources identified in the survey. Sanitary surveys made for selection of locations for wells should consider the following items:**

- a. Character of local geology, size and topography of catchment area, and slope of ground surface, as such factors relate to the potential transport of contaminants toward the well.
- b. Nature of soil and underlying porous strata whether clay, sand, gravel or rock (especially porous limestone); coarseness of sand or gravel, thickness of waterbearing stratum, depth to water table, location and log of wells in the vicinity that are in use and/or abandoned, as such factors relate to the potential transport of contaminants toward the well. Geologic data should be determined for new wells at 5 ft (1.5m) intervals and at each pronounced change in formation along with other pertinent well drilling information. KGS maintains a Well Sample Library in Wichita.
- c. Slope of water table, preferably as determine from observation wells, or studies of wells on the area.
- d. Extent of drainage area likely to contribute water and potential contaminants to the supply, population of, and waste disposal methods in the drainage area.
- e. Susceptibility of the proposed well location to flooding from nearby surface waters as indicated by the boundaries of flood plain delineations or historical high water elevations.
- f. Nature, distance, and direction of potential local sources of pollution such as animal feedlots, sanitary landfills, seepage pits, cesspools, septic tank-lateral fields, private sink holes, salt or brine supplies, test holes, abandoned wells, borings, and chemical, manufacturing, handling, and storage facilities, including underground storage tanks and pipeline for industrial products, and industrial lagoons.
- g. Special care should be taken to determine nitrate sources in the proposed well's recharge area and to evaluate fully the nitrate concentration in the aquifer in which the well will be completed. In addition to nitrate sampling of the proposed public water supply well, other sources of information that should be considered include data from irrigation wells or other water supply wells in the general vicinity of the proposed public water supply well, other sources if information that should be considered include data from irrigation wells or other water

supply wells in general vicinity, KGS bulletins assessing geohydrology of the region, and data from the KDHE Groundwater Quality Monitoring Network. The nitrate level in the aquifer in which the well will be completed should be significantly less than the current nitrate MCL unless blending with other low nitrate wells is intended or treatment for nitrate removal will be provided.

2. LOCATION AND PROTECTION OF WELLS - Groundwater sources should be located, constructed, and maintained in a manner which will assure the minimum possibility of contamination and be so situated and developed as to prevent surface after from entering the well. During the installation of the well, the contractor shall provide protection to prevent tampering or accidental entrance of foreign materials. Specific siting limitations for new wells are the following:

- a. There must be an absence of pollution sources within 100 ft (30.5 m) of the well. Documentation must be provided to confirm the absence of each source. Either ownership or a perpetual easement must be obtained by the owner if the well for the land within 100 ft (30.5 m) measured horizontally out from the well center. In either case, positive assurance is to be provided that no septic tanks, wastewater facilities, sanitary sewers, force mains, or tile absorption fields will be allowed within that area.

The owner may use the land for agricultural or pasture purposes except that livestock must be kept at least 100 ft (30.5m) away from the well. Use of the land for any purpose shall not significantly contribute to pollution of the source water. Sanitary sewers to serve residential areas outside the 100 ft (30.5 m) wide protected zone shall transport the wastewater, wither treated or untreated, to either a point downstream from the well or to a separate watershed.

If the land area in question is owned by someone other than the owner of the PWSS, then a copy of a perpetual easement, detailing any limits or constraints on the use of the land either party and showing the stamp of the Register of Deeds, must be submitted to KDHE. If the land is owned by the PWSS, then they must provide a letter to KDHE which acknowledges the ownership. Where the land area in question is owned by the PWSS and other owners, then the ownership letter and perpetual easements must be submitted to KDHE for the appropriate areas of

land. In all cases, the documents must indicate that no potential sources of pollution will be allowed within 100 ft (30.5 m) of the well.

- b. Proper drainage in the vicinity of the well shall be provided so as to prevent the accumulation of surface water, either by runoff or backflow, to within 100 ft (30.5 m) of the well.
- c. Wells located on a hillside or at the foot of a hill shall be avoided where sources of pollution are present on the slope above and within 300 ft (91 m) horizontally of the well. An adequate intercepting ditch shall be constructed and maintains so as to keep hillside storm water at least 100 ft (30.5 m), measured horizontally, away from the well.
- d. The well shall not be located on a ravine where surface water flows may ve obstructed or concentrated.
- e. Shallow wells with screen openings less than 50 ft (15.2 m) deep shall not be located within 200 ft (61 m) of a surface water unless treatment will be provided that fully complies with all requirements applicable to groundwater sources under the influence of surface waters (see Chapter V, Section M on Disinfection). On a case by case basis, KDHE may approve the installation of such a well without the necessity of providing such treatment, upon submittal of a report by a qualified professional establishing that under the particular hydrogeologic conditions, the proposed well will not be under the direct influence of any surface water.
- f. The well vent on a pitless unit, or a vent in a well house or an platform must be located at least 2 ft (0.6 m ) about the 100 year flood level to prevent contamination by flood waters. If this level is not known, then the required elevation is at least 2 ft (0.6 m) above the highest known flood level.

3. CONSTRUCTION CRITERIA FOR WELLS - The following criteria should be followed in constructing a PWS well. Also, information about well abandonment is presented. Additional design requirements for pumps are presented in Chapter VII on Pumping Facilities.

- a. CONTRACTOR LICENSING - Any water well contractor involved on the construction or reconstruction of any public water supply well shall posses a valid water well contractor's license, issued by the KDHE

under the provisions of KAR 28-30-3. All contractors shall submit to KDHE a completed water well record from WWC-5 upon construction, reconstruction, or plugging of a public water supply well.

**b. DRILLING FLUIDS, ADDITIVES, AND PACKERS**

- 1) Drilling procedures or materials such as drilling fluids, additives, and packers shall not impart any T&O's, toxic substances, bacterial contamination, or any other regulated water quality contaminant to the well installation or the aquifer, itself.**
- 2) Water used for drilling fluids shall be from a fresh, nonpolluted source. Only drilling fluids which do not plug the aquifer should be used. The use of organic drilling fluids, such as formed through the addition if polymeric additives, have the potential for enhancing biological activity within the aquifer and are not approved.**
- 3) When additives to the drilling fluid are used, drilling-fluid properties shall be maintained within limits that will allow the additives' complete removal from the well and not damage the potential capacity, efficiency, or quality of the well.**

**c. TEMPORARY SEALING REQUIREMENTS**

- 1) During construction, a temporary means of sealing the well shall be provided to prevent debris or any contaminants from entering the well or annular space.**
- 2) Wells in which no pump is installed shall be securely sealed until setting of the pump or plugging of the well upon abandonment.**
- 3) A welded metal plate or a threaded cap is the preferred method for temporary sealing of a well.**

**d. WELL CASING**

- 1) All wells shall have durable watertight casing from at least on foot (0.3m) above finished ground surface to the top of the producing zone of the aquifer. The casing shall extend at least 20 ft (6.1 m) below the ground level.**
- 2) All casing material shall be new and conform to the types, manufacturing standards, and minimum diameter requirements specified in AWWA Standard A100 (4). Minimum wall thickness requirements for steel well casing shall conform to AWWA Standard A100 (4). Minimum wall thickness requirements for thermoplastic well casing shall confirm to ASTM F480 (22).**
- 3) Joints should be watertight and of the type specified in AWWA Standard A100 (4).**
- 4) The casing shall extend not less than 12 in (0.30 m) above the top of the well house floor. No casing shall be cut off below the ground surface except to install a pitless unit.**
- 5) The casing should be provided with sufficient guides welded to the casing to permit unobstructed flow and uniform thickness of grout.**
- 6) The top of the well casing shall be sealed by installing a sanitary well seal.**

**e. WELL SCREEN**

- 1) The well screen serves as the intake section of a water supply well, allowing the passage of water from an aquifer in unconsolidated formations such as sand and gravel. The screen also provides structural support for the surrounding formation. The screen should be designed to promote the free flow of water into the well pump area while preventing the entrance of sand.**
- 2) The screen aperture size should be designed to retain a certain specified percentage of the formation material for naturally**

developed wells or gravel-pack material for gravel-packed wells as determined by accepted well design practices and site specific conditions.

- 3) The entrance velocity into the screen should not exceed 0.1 ft/sec (0.03m/s) based on the maximum anticipated well flow rate or yield as determined by the following formula:

$$V_e = \frac{Q}{7.48 A_e L}$$

Where:

$V_e$     ≡ entrance velocity (ft/min)  
 $Q$       ≡ maximum well flow rate or yield (gpm)  
 $A_e$     ≡ Effective aperture area per foot of screen (ft<sup>2</sup>/ft).      The effective aperture area should be taken as one half of the total aperture area per foot of screen to allow for clogging for slots.  
 $L$       ≡ Length of screen (ft)  
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KDHE will approve entrance velocities that exceed the 0.1 ft/sec (0.03m/s) limit upon a showing that higher velocities will not impair the integrity of the well screen or result in excessive head loss.

- 4) Screen length should be determined by the thickness and hydrologic character of the aquifer, in conjunction with the determination of screen aperture size.
- 5) In some applications, other considerations such as approach velocities, turbulent versus laminar flow, and velocity distributions into the screen and through the aquifer, may require variance from the above screen design criteria.
- 6) The material from which the screen is fabricated shall be corrosion resistant and not susceptible to damage by chemical

action of groundwater or cleaning operations.

- 7) Joints between screen sections and blank casing spacers should be welded or threaded, watertight, straight, and as strong as the screen.
- 8) Guides should be placed above the below all screen sections to hold the screen in the center of the borehole.

**f. GRAVEL PACK**

- 1) Gravel pack is installed in the annular space between the screen (and casing) and bore hole for the purpose of stabilizing the formation.
- 2) Gravel pack should consist of smooth, well rounded particles, at least 95 percent siliceous material with an average specific gravity of not less than 2.5. Before placement, the gravel pack should be washed and free of shale, mica, clay, dirt, loam, and organic impurities of any kind, and contain no iron or manganese in form or quantity that will adversely affect the water quality.
- 3) Gravel-pack design should be based on the ratio of the grain size of the gravel pack to the formation material and sized to stabilize the native formation and yet allow water to be produced from it as determined by accepted well design practices and site specific conditions. The gradation of the gravel pack should be selected after test hole samples of the formation material to be screened have been sieved and analyzed pursuant to ASTM C136 (22).
- 4) The gravel pack should be placed in a continuous layer of material surrounding the entire screen without bridging or voids and extend above the screen to a height sufficient to compensate for potential settlement of the gravel pack during well development and provide a sufficient buffer between the well intake and the annular seal above. The minimum thickness of the gravel pack to allow for proper placement of the gravel-pack material in the annulus around the screen is 4 in (10.2 cm).

- 5) Before placement in the well annulus, the gravel-pack material shall be disinfected by immersing the gravel in a chlorine solution containing not less than 200 mg/L of available chlorine.
- 6) The installation of gravel refill pipes are approved by KDHE where excessive loss of gravel-pack material is anticipated to occur due to formation conditions. Gravel refill pipes shall be Schedule 40 steel and located in the grouted annular opening of the well, surrounded by a minimum of 1.5 in (3.8 cm) of grout. The pipes shall be incorporated within the pump foundation, and extend at least 12 in (0.3 m) above the pump house floor or concrete apron. To prevent contamination of the well, the gravel refill pipe shall be provided with a secure, access lid or cap, designed to completely cover the opening of the pipe and provided a watertight seal.

**g. GROUTING OF ANNULAR SPACE BETWEEN THE CASING AND DRILLING HOLE**

- 1) Wells shall be sealed by grouting the annular space between the casing and the well bore from ground level to a minimum of 20 ft (6.1 m) or to a minimum of 5 ft (1.5 m) into the first clay or shale layer, if present, whichever is greater. If a pitless well unit where it attaches to the well casing and shall start below the junction of the pitless well unit where it attaches to the well casing and shall continue a minimum of 20 ft (6.1 m) below this junction or to a minimum of 5 ft (1.5 m) into the first clay or shale layer, if present, whichever is greater.
- 2) To facilitate grouting, the grouted interval of the well bore shall be drilled to a minimum diameter at least 3 in (7.6 cm) greater than the maximum outside diameter of the well casing. If a pitless well unit is being installed on the well's casing, the well bore shall be a minimum diameter of at least 3 in (7.6 cm) greater than the outside maximum diameter of the well casing through the grouted interval below the junction of the pitless well unit where it attaches to the well casing.

- 3) Protection from leakage of grout into the gravel pack or well screen shall be provided.
- 4) Waters from two or more separate aquifers shall be separated from each other in the bore hole between the aquifers with grout or other material specifically approved by KDHE.
- 5) If a dummy casing is to be retained, the annular space between a dummy well casing shall be filled with grout having a minimum thickness 1.5 in (3.8 cm) to a minimum depth of 20 ft (6.1 m). In addition, the annular space between the dummy casing and well bore shall be grouted as specified in this chapter.
- 6) Sand-cement grout or neat cement grout shall be used for grouting the annular space from ground level to 20 ft (6.1 m) below the surface, from the junction of the pitless well unit with the well casing to 20 ft (6.1m) below the unit.
  - a) “Sand-cement grout” means a mixture consisting of one 94 lb (42.6 kg) bag of portland cement (ASTM C150) to an equal volume of sand having a diameter no larger than 0.080 in (2mm) to a 5 to 6 gal (18.9 to 22.7 L) of water.
  - b) “Neat cement grout” means a mixture consisting of one 94 lb (42.6 kg) bag of portland cement (ASTM C150) to 5 to 6 gal (18.9 to 22.7 L) of water. A maximum of 5 percent, by weight, bentonite may be added. Other additives may be used only with KDHE approval.
  - c) Water used to mix cement grout should be clean, fresh water, free of oil or other organic material, and with a total dissolved mineral content less than 2,000 parts per million. A water used with a high sulfate content should be avoided.
  - d) Care should be exercised to control the heat of hydration during grouting where thermoplastic well casing has been installed. Additives that ten to significantly increase the heat of hydration are not recommended.

7) For PWS wells, KDHE does not recommend the use of annular seals consisting solely of bentonite seals have sufficient shear strength to resist hydrostatic forces in certain aquifer systems. Bentonite clay grouts are approved for grouting the annular space in a well for depths greater than 20 ft (6.1 m) from the surface (or greater than 20 ft (6.1 m) below the junction of a pitless well unit with the well casing), where the initial 20- foot (6.1- meter) length of annular space will be sealed with a sand-cement or neat cement grout.

- a) “Bentonite clay grout” means a mixture consisting of water and commercial grouting sodium bentonite clay as per the manufacturer’s recommendations to achieve a weight of not less than 9.4 lb (4.3 kg) of bentonite clay per gal (3.8 L) of mix. Weighing agents may be added as per the manufacturer’s recommendations.
- b) Sodium bentonite pellets, tablets, chips, or other granular sodium bentonite are acceptable as an annular seal at depths greater than 20 ft (6.1 m) provided the material can be installed without bridging or voids and it meets the 9.4 lb (4.3 kg) of bentonite clay per gal (3.8 L) mix requirement.
- c) Sodium bentonite products that contain low solids, are designed for drilling purposes, or that contain organic polymers shall not be utilized for grouting the annular space of a well.

**h. PLUMBNESS AND ALIGNMENT REQUIREMENTS**

- 1) The completed well shall be sufficiently plum and straight so that there will be no interference with the installation, alignment, operation, or future removal of the permanent well pump.
- 2) Every well should be tested for plumbness and alignment.
- 3) The test method for plumbness and alignment and allowable tolerance shall be clearly stated in the construction specifications for the well.

i. DEVELOPMENT

- 1) Every well shall be developed to remove the native silts and clays, drilling mud, or finer fraction of the gravel pack.
- 2) The construction specifications for the well shall provide for the application of appropriate well development techniques for the optimization of well efficiency and specific capacity. The specifications should further define criteria for determining satisfactory completion of well development. In general, development should continue until the optimum specific capacity is obtained from the completed well. Additional criteria for determining completion of well development may include a limit on sand content. If so, a method for measuring sand content should be specified.
- 3) Records of all development work should be maintained including measurements of key parameters at appropriate time intervals such as static and pumping water levels, production rates, specific capacity, sand content, specific conductance, temperature, etc.
- 4) Where chemical conditioning is required, the construction specifications for the well shall include provisions for the method, equipment, chemicals, testing for residual chemicals. And disposal of waste and inhibitors.

j. WELL CAPACITY TESTS

- 1) Yield and drawdown tests shall be performed on every public water supply well prior to placement of the permanent pump in order to verify the pumping rate and the capability of the well and aquifer to maintain this production level. The test methods shall be clearly described in the construction specifications for the well.
- 2) Well capacity tests should be conducted only after development of the well has been completed satisfactorily.

3) During the tests, the discharge of the pump shall be conducted either by pipeline or line channel beyond the potential zone of influence of the well.

4) A constant-discharge test should be conducted consisting of continuous pumping of the supply well at a rate at least as high as the long-term production rate to be required from the well. Water-level measurements should be obtained before, during, and after the pumping tests in order to determine the static water levels, to evaluate the effect of pumping, and to determine a profile if the recovery of the water level from the pumping state to the original, static level. The measurement frequency of water levels during pumping should be such that an adequate delineation of the time-drawdown data is obtained. Additional tests such as step drawdown are recommended.

k) DISINFECTION - KDHE procedures for disinfecting gravel packed wells and completed wells, whether new, modified, or reconditioned, are as follows:

1) All drilling waters used during the construction or reconstruction of any water well shall be initially disinfected by mixing with the water enough sodium hypochlorite to produce at least 200 mg/L of available chlorine.

2) Gravel for ground-packed wells shall be disinfected prior to placement by immersing disinfected prior to placement by immersing the gravel in a chlorine solution containing not less than 200 mg/L of available chlorine. A satisfactory solution may be made by mixing about 5 oz (140 g) of high test calcium hypochlorite (65 - percent available chlorine) with 100 gal (380 L) of water .

3) Completed wells, after development, shall be disinfected by adding sufficient hypochlorite solution to produce a concentration of not less than 100 mg/L of available chlorine when mixed with water in the well. This corresponds to the use of the 1.5 lb (0.68 kg) of high test calcium hypochlorite (65 percent available chlorine) per 1,000 gal (3,785 L) of water in the well.

- 4) Just prior to setting, the pump and the pump column shall be washed down with a 200 mg/L available chlorine solution.

1. ABANDONED WELLS AND TEST HOLES - Before any well or test hole drilled in connection with a water supply is abandoned, it shall be plugged in such a manner as to prevent the pollution of the groundwater by contaminating substances. Abandoned water wells and test holes shall, whether cased or uncased, be plugged on accordance with the requirements of KAR 28-30-7.

4. CONSTRUCTION CRITERIA FOR WELL HOUSES, DISCHARGE PIPING, AND RELATED APPURTENANCES - The following criteria must be followed in constructing a well house. In addition, criteria for discharge piping and appurtenances is presented. Additional design requirements for pumps are presented in Chapter VII on Pumping Facilities.

a. GENERAL WELL HOUSE REQUIREMENTS

- 1) The well house shall be provided with a doorway and a door at least 2 ft 8 in (0.8 m) by 6 ft 8 in (2.0 m) which opens outward and extends to the floor. The door shall be equipped with a lock.
- 2) Well houses located on hill slopes shall have not less than 50 percent of the floor area above the ground level and the door located in that part of the floor above the ground level.
- 3) The well house walls and ceiling must be insulated.
- 4) Where necessary, additional protection against freezing shall be provided by installing a thermostatically controlled electric heater or other suitable type of heating unit.

b. WELL HOUSE FLOOR

- 1) The well house floor elevation shall accommodate the well vent elevation requirement the vent be located at least 2 ft (0.6 m) above the 100 year flood level. If this level is not known, then the required vent elevation is at least 2 ft (0.6 m) above the highest known flood level.

- 2) The top of the floor slab shall not be less than 1.5 ft (46 cm) above the natural ground.
- 3) The well house floor shall be constructed of reinforced, water tight concrete not less than 4 in (102 mm) thick at any point.
- 4) The joint between the concentrate pump base and floor shall be water tight. The pump base shall be extended to natural ground to provide solid support.
- 5) The floor shall extend not less than 3 ft (0.9 m) in all directions from the outer edge of the drill hole.
- 6) The floor slab shall rest upon thoroughly compacted earth or upon a protected settled sand fill.
- 7) The floor shall slope at a rate of 1/8 ipf (1.2 cm/c) toward the floor drain.

c. FLOOR DRAIN

- 1) A minimum 4 in (102 mm) floor drain with a perforation or screened cover shall be provided.
- 2) The drain pipe shall carry the drain water to the ground surface at least 4 ft (1 m) from the well house wall at which point the pipe may be connected to other suitable 4 in (102 mm) pipe so that the drainage will be carried to the ground surface at least 20 ft (6.1 m) from the well.
- 3) The drain pipe shall be laid on a grade of not less than 1/8 ipf (1.04cm/m) and shall discharge into the surface on the ground. The drain shall not be connected to any storm drain, sanitary sewer or any other closed conduit. The discharge end of the drain line should be covered with a course non-corrodible screen to prevent the entrance of small animals.

**d. CASING SEAL AND DISCHARGE PIPING**

- 1) The casing shall extend at least 1 in (2.5 cm) into the pump base plate so as to form an overlapping seal. On flat pump base plates and on the other base plates where radial ribs interfere, a metal skirt projecting downward may be welded to the outside edge if the base plate to form the overlapping cover for the well casing.**
- 2) The metal pump base plate shall be grouted and bolted or otherwise securely sealed to the concrete base so as to be watertight.**
- 3) The discharge line, and meter, check and shutoff valves shall be located above the well house floor.**

**e. WELL VENT**

- 1) The vent shall be constructed of metal tubing or pipe and fitted through the pump base as to form a watertight connection with the base.**
- 2) The vent shall terminate in a full 180° return bend not less than 2 ft (0.6m) above the pump base.**
- 3) The opening in the vent shall be screened with 16-mesh non-corrodible screen.**

**f. WATER WELL MEASUREMENTS**

- 1) Provisions shall be made for the periodic measurement of water levels in the completed well accordance with specifications of DWR (23). The following water level measurement methods are approved for public water supply wells:**
  - a) Air line method,**
  - b) Separate observation well within 25 ft (7.62 m) of the production well, or**
  - c) Electronic water level measurement sensors.**

- 2) Air line method - The air line method measures depth to water level by determining the air pressure required to push water out of a submerged tube of known length. The air line tube shall be constructed of corrosion-resistant materials and pass through the pump base inside the well casing in a manner that will provide for a watertight seal between the pipe and the pump base, i.e, a watertight packing gland or equal shall be provided where it passes through the pump base. To avoid turbulence near the intake if the pump, the lower end of the air line should be several feet above or below the point where water enters the pump but still extend below the lowest possible pumping level. The upper end of the tube is fitted with suitable connections for an air gauge, valve, and air pump. The actual installed length of air line shall be indicated on a metal plate in the immediate vicinity of the well.

**g. VALVES AND OTHER APPURTENANCES**

- 1) The pump discharge line shall be equipped with a check, valve shutoff valve, and a standard pressure gauge.
- 2) Air/vacuum relief valves - Combination air and vacuum relief valves may be required where air is forced into the pump discharge line through the pump resulting in decreased efficiency and possibility of surges within the lines. These valves are potential sources of contamination to the water supply because contaminants can be drawn into the water supply on the vacuum relief cycle.

The vent discharge lines from air/vacuum relief valves on pump discharge lines should terminate in a downward position about 2 ft (0.6m) above the floor of the well house. If splashing is a problem, a loose fitting “splash guard” may be used. The end of the vent discharge line should be screened with 16-mesh non-corrodible screen. In no case should the vent discharge line be tightly connected to the floor drain. Air/vacuum relief valves on pump discharge lines should be located on the pump side of the check valve and meter.

- 3) Meters - Meters shall be provided for all wells. Meters shall meet the specifications of DWR (24). Meters should be located on the pump discharge line and on the pump side of a shutoff valve but after the air/vacuum release valve and check valve.
- 4) Sampling tap - A sampling tap is required on the discharge side of the pump and after the point of chlorine application to obtain samples for measurement of chlorine residual (or other necessary measurements). A distance of at least 10 ft (3.0 m) should be maintained piping where the chlorine solution is applied and the location of the sampling tap. The piping layout in most well houses does not provide this much distance, therefore the sampling line extends back into the well house. It is desirable to provide a gate valve in the sampling line ahead of the tap or hose bib so that the tap can be repaired or replaced without depressurizing a portion of the distribution system.
- 5) CONSTRUCTION CRITERIA FOR PITLESS UNITS AND RELATED APPURTENANCES
- a. APPROVAL CRITERIA - The use of pitless units for public water supply wells for below-ground discharge is approved. Pitless “adapters” are not approved for this purpose. A pitless unit is one which has been manufactured as a complete unit specifically for attaching to the well casing at a point below frost line to form a continuous, unbroken extension of the casing to at least 12 in above the ground surface. The unit may be either submersible pumps or for deep well type turbine pumps and must permit the pumps to be readily removed. The unit material of construction shall be compatible with the casing. The inside diameter should equal that of the casing up to and including diameters of 12 in(0.3 m) to facilitate repair work on the well, pump, or well screen. KDHE approval is required for any connections where the pitless diameter is different from the casing. The water delivery pipe shall be attached below frost level by a threaded fitting.

- b. LIMITATIONS ON FIELD WELDING - If the connection to the casing is by field welding, the shop-assembled unit must be designed specifically for field welding to the casing. The only field welding permitted will be that needed to connect a pitless unit to the casing and must be a continuous weld.
- c. CONCRETE SLAB - In lieu of a well house, a reinforced concrete slab not less than 4 in (10 cm) in thickness and extending 3 ft (0.9 m) beyond the well drill hole in all directions shall be provided. The slab shall form a watertight joint with the pitless unit.

The slab should preferably be placed at the ground finish grade, 1.5 ft (0.46 m) minimum above the natural ground, and shall slope away from the casing. The concrete slab shall be designed and constructed to withstand alternating freezing and thawing conditions. Approval may be given for placement of the slab below the pitless unit and below ground level. Where a pitless unit is used, a protective railing or steel posts shall be provided in such a manner that the pitless unit may not be damaged by machinery or farm animals.

d. APPURTENANCES

- 1) Check valve - There shall be at least one check valve IV-26 within the well casing.
- 2) Sanitary well seal - The top of the pitless unit shall be securely fitted with a sanitary well seal, which creates an air and watertight seal. The pitless unit shall also be adapted to receive a contamination-proof conduit for power purpose.
- 3) Well vent - The pitless unit shall be fitted with a vent, which shall terminate in a full 180° return bend. The elevation of the well vent shall be not less than 2ft (0.6 m)

above the 100 year flood level. If this level is not  
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known, then the required vent elevation is at least 2 ft (0.6 m) above the highest known flood level. The opening in the vent shall be screened with 16-mesh non-corrodible screen.

- 4) Water level measurement - Provisions shall be made for the periodic measurements of water levels in the completed well accordance with specifications of DWR (23). Tubes or cables, required for measurement of water levels, shall be installed through special fittings in the watertight cap in a manner to prevent the entrance of surface water or other contaminants within the well casing.
- 5) Meter - Each well must be provided with a meter as specified by DWR (24). Meter boxes or vaults should be constructed with crushed rock bottoms (French drains) to permit drainage and located and covered so as to minimize the entrance of surface water. A shut-off valve should be located downstream from the meter.
- 6) Sampling tap - A means should be provided to collect water samples from the well or discharge piping.

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## **ORGANIZATION REFERENCED IN DESIGN BULLETIN**

**American Water Works Association (AWWA), 6666 W. Quincy Avenue, Denver, CO 80235 (1-800-926-7337).**

**American Society of Mechanical Engineers (ASME), 345 East 47<sup>th</sup> Street, New York, NY 10017.**

**American Society of Testing and Materials (ASTM), 1916 St., Philadelphia, PA 19103-1187 (215-299-5585).**

**California State University c/o Ken Kerri - Water Treatment Plant Operator Training Manuals, Sacramento, 6000 J. Street, Sacramento, CA 95819-6025 (916-278-6142).**

**Chlorine Institute, Inc. 2001 “L” Street, N.W., Suite 506, Washington, D.C. 20036 (202-775-2790).**

**Division of Water Resources, Kansas State Board of Agriculture, Mills Building, 109 SW 9<sup>th</sup>, Suite 202, Topeka, KS 66612-1283 (913-296-3717).**

**Ductile Iron Pipe Association, 245 Riverchase Parkway East, Suite O, Birmingham, Alabama 35224 (205-988-9870).**

**Foundation for Cross-Connection Control and Hydraulic Research, School of Engineering MC-2531, University of Southern California, P.O. Box 77902, Los Angeles, CA 90099-3334.**

**Health Education Services, P.O. Box 7126, Albany, NY 12224 (518-439-7286).**

**Insurance Services Office, 160 Water St., New York, NY 10038.**

**Kansas Department of Health and Environment, Bureau of Water (Public Water Supply Section) Building 283 Forbes Field, Topeka, KS 66620 (913-296-5514)**

**Kansas Geological Survey, Moore Hall, 1930 Constant Ave., West Campus, University of Kansas, Lawrence, KS 66047 (913-864-3965).**

**Kansas Water Office, 109 SW 9<sup>th</sup> St., Suite 200, Topeka, KS 66612-1215 (913-296-3185).**

**National Groundwater Association (NGWA), 6375 Riverside Dr., Dublin, OH 43017 (1-800-551-7379. The NGWA distributes a variety of materials related to water well construction and groundwater sampling procedures.**

**national Technical Information Services (NTIS), U.S. Department of Commerce, Springfield, VA 22161 (703-487-4650). The NTIS processes orders for most USEPA publications which are currently in print.**

**NSF International, 3475 Plymouth Road, Ann Arbor, MI 48113-0140, (313-769-8010).**

**Safe Drinking Water Hotline (EPA): (1-800-426-4791).**

**State Conservation Commission, Mills Building, 3<sup>rd</sup> floor, 109 SW 9<sup>th</sup> St., Topeka, KS 66612 (913-296-3600).**

**Uni-Bell PVC Pipe Association, 2655 Villa Creek Drive, Suite 155 Dallas, TX 75234.**

## **APPENDIX A**

### **LISTING OF SELECTED KANSAS STATUTES AND REGULATIONS PERTAINING TO PUBLIC WATER SUPPLY**

LISTING OF SELECTED KANSAS STATUTES AND REGULATIONS  
PERTAINING TO PUBLIC WATER SUPPLY

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KSA 65-102a	Written materials relating to environmental concerns; public inspection; copies, fee, approval; disposition of moneys.
KSA 65-156	Regulations and fees.
KAR 25-14-1	Fees for analysis of samples from water supply systems and wastewater systems.
KAR 28-14-2	Schedule of fees.
KSA 65-157	Analysis by office of laboratory services; disposition of fees.
KSA 65-161	Definitions.
KSA 65-162a	PWSSs; definitions.
KSA 65-163	PWSSs and water treatment residues; regulation; permits; investigations.
KSA 65-167	Sewage discharge; penalties for wilful and negligent discharge of sewage without permit or in violation of terms or permits.
KSA 65-170	Director of the division of environment; duties in carrying out the provisions of 65-161 to 65-170.
KSA 65-170a	PWSSs, water pollution, sewage discharge; "person" defined.
<b><u>KSA 65-170b</u></b>	<b><u>Access to properties and facilities; inspection and monitoring requirements.</u></b>
<b><u>KSA 65-170c</u></b>	<b><u>Penalties for making false statement, representation or certification.</u></b>
KSA 65-170d	PWSSs; pollution violations; penalties; procedure; hearings.
KSA 65-170e	PWSSs, water pollution, sewage discharge; action by attorney general; intervention in actions by persons having an identifiable interest.

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KSA 65-171d	Prevention of water pollution; standards; permits; exemption; orders; hearings; appeals; fees; right of ingress and egress; registration of new construction; separation distance established.
KSA 65-171g	Protection of water and air from sewage contamination.
KSA 65-171h	Minimum standards for sanitary water sewage systems.
KSA 65-171i	Analyses to be performed by laboratory certified by secretary.
KAR 28-15-35	Conditions of certification and approval.
<b><u>KAR 28-15-36</u></b>	<b><u>Standards for approval.</u></b>
<b><u>KAR 28-15-37</u></b>	<b><u>Fees.</u></b>
KSA 65-171m	PWSSs; primary drinking water standards; rules and regulations, authority to adopt, scope; stringency of standards; requiring fluorides prohibited.
KAR 28-15-11	Definitions.
KAR 28-15-13	Standards for bacteriological, chemical, physical, and radiological quality.
KAR 28-15-14	Monitoring requirements for laboratory tests.
KAR 28-15-15a	Public notice requirements.
KAR 28-15-16	Permit requirements for PWSSs.
KAR 28-15-17	Siting requirements.
KAR 28-15-18	Operations and maintenance requirements.
KAR 28-15-18h	Mandatory cross-connection control program.
<b><u>KAR 28-15-19</u></b>	<b><u>Disinfection of drinking water.</u></b>
KAR 28-15-20	Exemptions and variances.
KAR 28-15-21	Surface water treatment rule.

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KAR 28-15-22	Lead and Copper; general requirements.
KSA 65-171n	Development of Emergency plans by secretary.
KSA 65-171o	PWSSs; suppliers to provided notice, when; form of notice,
KSA 65-171p	PWSSs; variances; conditions; notice; requests for public hearing; scheduled compliance.
KSA 65-171q	Exemptions; required findings; notice; requests for public hearings; scheduled compliance.
KSA 65-171r	Prohibited acts.
<b><u>KSA 65-171s</u></b>	<b><u>PWSSs; violation of standards; penalties; procedure; hearing; judicial review.</u></b>
KSA 65-171t	Attorney general to seek injunctive relief.
KSA 65-171y	PWSS regulation of Lawn irrigation systems.
KSA 82a-1205	Administration and enforcement of Kansas groundwater exploration and protection act; licences fees; licenses; inspection; personnel; report.



## Livestock Waste Management Section

- [Statutes and Regulations](#)
- [Swine Applications](#)
- [Related Links](#)

[Bureau of Water](#).

[Geology](#).

[Industrial Programs](#).

[Livestock](#)

[Management](#).

[Municipal Programs](#).

[Public Water Supply](#).

[Technical Services](#).

[Watershed](#)

[Management](#).

[Watershed Planning](#)

[and TMDL Program](#).

[John Harsch, Chief](#)

**Bureau of Water**

**Livestock Waste Management Section**

**1000 SW Jackson St., Suite 420**

**Topeka, KS 66612-1367**

**(785) 296-0075**

**FAX: (785) 296-5509**

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### Purpose of the Livestock Waste Management Section

The Livestock Waste Management Section is organized within the KDHE Bureau of Water. The mission of the section is to protect the waters of the state of Kansas by educating and assisting the regulated community, reviewing and issuing **Livestock Waste Management Permits**, and ensuring compliance with applicable statutes, regulations and permitting requirements.

### General Information

Any facility with an animal unit capacity greater than 300 or more must register with the Kansas Department of Health and Environment (KDHE). Any facility with an animal unit capacity of 1,000 or more must obtain a **Livestock**

**Waste Management Permit.** Additionally, any facility that presents a significant water pollution potential, as determined by KDHE, must obtain a permit.

Each KDHE District Office maintains documentation of livestock facility compliance with Kansas statutes and regulations for facilities located within that district. Each District Office also maintains documentation relating to permitting requirements for new or expanding swine facilities in that district. The documentation includes all requirements which a swine facility must comply with and an explanation of the statutory and regulatory provisions on which the permitting requirements are based, an explanation of any departure from any requirements, and a fact sheet which contains a detailed description of the location of each new or expanding facility, a description of the new or expanding facility, a map, and a nutrient utilization plan, if required.

## **Swine**

This Swine Applications link will allow you to view all complete applications for new or expanding swine facilities which are currently on Public Notice in the Kansas Register. Only after KDHE has determined that an application is complete will the application be placed on public notice.

## **Disclaimer**

The purpose of this Web site is to provide users with a delivery system to review the Kansas Livestock Waste Management Permitting System as mandated by K.S.A. 65-1,179. Data provided is current as of the publication date. KDHE is not responsible for database integrity following download and publication or for the use of the data for any purpose other than the purpose expressed.

KDHE has made every effort to ensure the accuracy of the data, however, errors in the data are possible. Therefore data is provided without representation as to accuracy and without any warranty, either express or implied, as to accuracy.

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## **Related Links**

### **Environmental Links**

- [Environmental Protection Agency](#)
- [U.S. Fish and Wildlife Service](#)

### **Government Links**

- [U.S. Geological Survey](#)
- [Natural Resource Conservation Service](#)
- [Kansas Department of Agriculture](#)
- [Kansas Department of Wildlife and Parks](#)
- [Kansas Agricultural Statistics](#)
- [Kansas State University Animal Science](#)
- [State Conservation Commission](#)

### **Livestock Industry Links**

- [Kansas Livestock Association](#)
- [National Cattlemen's Beef Association](#)
- [National Pork Producers Council](#)
- [Kansas Pork Association](#)
- [American Sheep Industry Association](#)

Kansas Department of Health and Environment

Proposed Amended Regulation

**Article 18. - ANIMAL AND RELATED WASTE CONTROL**

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**28-18-1. Definitions.** The following words, terms, phrases, and abbreviations shall have the following meanings, unless otherwise defined in an individual regulation or unless a different meaning of a word is clear from the context in which it is used. Words, terms, phrases, and abbreviations not provided in the regulations of this article shall have the meaning defined in K.S.A. 65-101 et seq. and amendments thereto, K.A.R. 28-5-1 et seq., K.A.R. 28-16-1 et seq., K.A.R. 28-18a-1 et seq., K.A.R. 28-30-1 et seq., or the clean water act (CWA). When the same word is defined both in Kansas statutes or the regulations of this article and in any federal regulation adopted by reference in these regulations or in state regulations referenced in this article, and the definitions are not identical, the definition prescribed in Kansas statutes or the regulations of this article shall control.

(a) "Animal unit" is as defined in K.S.A. 1997 Supp. 65-171d(c)(3), as amended by L. 1998, ch. 143, sec. 1, and amendments thereto.

(b) "Animal unit capacity" is as defined in K.S.A. 1997 Supp. 65-171d(c)(4), as amended by L. 1998, ch. 143, sec. 1, and amendments thereto.

(c) "Animal waste management system" means any land, structures, or practices utilized for the

(n) "Fur animals" means any animal raised for its skin, pelt, or fur.

**(o) "Groundwater" means, as used in this article, water located under the surface of the land that is or can be the source of supply for wells, springs, or seeps, or that is held in aquifers.**

(p) "Habitable structure" is as defined in K.S.A. 1997 Supp. 65-171d(c)(5), as amended by L. 1998, ch. 143, sec. 1, and amendments thereto.

(q) "Land application" means the distribution of animal or other process wastes onto, or incorporation into, the soil mantle for the purpose of disposal or utilization by crops or vegetation.

(r) "Liner" means any designed barrier in the form of in situ, layer, membrane, or blanket materials

utilized or installed to reduce the potential for a significant hydrologic connection between animal or other process wastes that are controlled or retained by animal waste management systems and waters of the state.

(s) "Minimum standards of design, construction, and maintenance" means the following:

(1) Effluent standards and limitations;

(2) other performance standards for treatment or utilization; and

(3) other standards of design, construction, and maintenance for confined feeding facilities published by the department.

**(t) "Monitoring" means all procedures using any of the following methods:**

**(1) Either systematic inspection or collection and analysis of data on the operational parameters of an animal feeding facility or its pollution controls; or**

**(2) the systematic collection and analysis of data on the quality of the animal or other process wastes, groundwater, surface water, or soils on or in the vicinity of the animal feeding facility or areas utilized for land application of the animal or other process wastes.**

(u) "National pollutant discharge elimination system" or "NPDES" means the national system for the issuance of permits under 42 U.S.C. section 1342, and includes any state or interstate program that has been approved by the EPA administrator, in whole or in part, pursuant to 42 U.S.C. section 1342.

(v) "Oil or gas well" shall have the meaning of the term "well" as defined in K.S.A. 1997 Supp. 55-150(i), and amendments thereto.

(w) "Operator" means an individual, association, company, corporation, municipality, group of individuals, joint venture, partnership, a state or federal agency or department, or any business owning, leasing, or having charge or control of one or more confined feeding facility.

(x) "Water pollution control permit" means an authorization, license, or equivalent control document issued by the department. A permit shall not include any document that has not yet been the subject of final action by the department, including a draft or proposed permit.

(y) "Pleasure animals" means dogs, cats, rabbits, horses, and exotic animals.

(z) "Point source" is as defined in K.A.R. 28-16-28b (mm).

(aa) "Pollution" is as defined in K.S.A. 1997 Supp. 65-171d (c)(1), as amended by L. 1998, ch.

(b) The operator shall not initiate operation of the new confined feeding facility or animal waste management system or the expanded portions of any existing confined feeding facility or animal waste management system, until after issuance of the new or modified permit by the department. Initiation of construction before the issuance of a new or modified permit by the department shall be deemed to be solely at the risk of the operator.

(c) For the purpose of these regulations, any reference to a professional engineer or consultant shall be deemed to designate an individual offering a service for fee for the design of a confined feeding facility or animal waste management system, exclusive of any nutrient utilization plan, soils or cropping consultations, hydrologic work involved in conducting hydrologic or geologic investigations, or in the siting, design, or construction of groundwater monitoring wells. Any reference to a professional engineer shall be deemed to designate an individual licensed to practice engineering in Kansas by the Kansas state board of technical professions.

(d) Consultants that prepare plans and specifications for the new construction or new expansion of confined feeding facilities that are submitted to KDHE for approval shall provide KDHE with evidence that adequate general commercial liability insurance coverage addressing errors and omissions in the design plans and specifications has been obtained and is in effect.

(e) Each operator shall initiate any proposed new construction or new expansion of a confined

(g) A new confined feeding facility or animal waste management system shall not be built in any stream, river, lake, reservoir, or water bodies meeting the definition of jurisdictional wetlands consistent with K.A.R. 28-16-28b(ww)(3).

(h) Each operator, when directed by the department, shall notify the department a minimum of two days before performing any soil sample collection activities or liner integrity testing to allow opportunity for department staff to witness the activities.

(i) There shall be no deviation from plans and specifications submitted to and approved by the department, unless amended plans and specifications showing proposed changes have been submitted to and approved by the department.

(j) Each construction plan shall indicate the location of any active, abandoned, or plugged water, oil, or gas well within 600 feet of any planned location for a waste-retention lagoon or pond. If the operator is unable to confirm the exact location of any well or wells, the construction plan shall contain a note indicating the potential for the well or wells to be located in the vicinity of any proposed lagoon or pond. Any active, abandoned, or plugged water, oil, or gas well that is encountered during construction and that was not identified or located on the construction plan shall be reported to the department within 48 hours of discovery. Construction activities that would impact the well or wells or that would be in the immediate vicinity of the well or wells shall be immediately terminated until the department authorizes the construction to resume.

(k) Following the completion of construction, each operator proposing the construction of a new confined feeding facility or the expansion of an existing confined feeding facility that will utilize an animal waste management system shall submit to the department a certification and, when requested, any supporting documentation, acknowledging whether or not the animal waste management system was constructed in accordance with the plans and specifications approved by the department. The certification shall be signed either by a professional engineer or an approved consultant representing the operator, who monitored the construction or installation of the animal waste management system, including any liner. The certification shall be based on actual observations during construction and any field or laboratory data developed during or following construction. (Authorized by K.S.A. 1997 Supp. 65-171d, as amended by L. 1998, ch. 143, sec. 1; implementing K.S.A. 1997 Supp. 65-164, K.S.A. 1997 Supp. 65-165, as amended by L. 1998, ch. 62, sec. 1, K.S.A. 65-166, K.S.A. 1997 Supp. 65-166a, K.S.A. 1997 Supp. 65-171d, as amended by L. 1998, ch. 143, sec. 1, and K.S.A. 65-171h; effective Jan. 15, 1999.)

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28-18-13. *Operation of animal waste management systems.* (a) The animal waste management

Kansas Department of Health and Environment

Proposed New Regulation

**Article 18a. SWINE AND RELATED WASTE CONTROL**

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**28-18a-1. Definitions.** The following words, terms, phrases, and abbreviations shall have the following meanings, unless otherwise defined in an individual regulation or unless a different meaning of a word is clear from the context in which it is used. Words, terms, phrases, and abbreviations not provided in the regulations of this article shall have the meaning defined in K.S.A. 65-101 et seq. and amendments thereto, K.A.R. 28-5-1 et seq., K.A.R. 28-16-1 et seq., K.A.R. 28-18-1 et seq., K.A.R. 28-30-1 et seq., or the clean water act (CWA). When the same word is defined both in Kansas statutes or the regulations of this article and in any federal regulation adopted by reference in these regulations or in state regulations referenced in this article, and the definitions are not identical, the definition prescribed in Kansas statutes or the regulations of this article shall control.

(a) "Agronomic application for swine wastes" is as defined in K.S.A. 1997 Supp. 2-3302 (k), as amended by L. 1998, ch. 143, sec. 23, and amendments thereto, and is regulated by the secretary of the Kansas department of agriculture.

(b) "Animal unit" is as defined in K.S.A. 1997 Supp. 65-171d(c)(3), as amended by L. 1998, ch. 143, sec. 1, and amendments thereto.

(c) "Animal unit capacity" is as defined in K.S.A. 1997 Supp. 65-171d(c)(4), as amended by L. 1998, ch. 143, sec. 1, and amendments thereto.

(aa) "Minimum standards of design, construction, and maintenance" means the following:

(1) Effluent standards and limitations;

(2) other performance standards for treatment or utilization; and

(3) other standards of design, construction, and maintenance for confined feeding facilities published by the department.

**(bb) "Monitoring" means all procedures using any of the following methods:**

**(1) Either systematic inspection or collection and analysis of data on the operational parameters of a swine feeding facility or its pollution controls; or**

**(2) the systematic collection and analysis of data on the quality of the swine or other process wastes, groundwater, surface water, or soils on or in the vicinity of the swine feeding facility or areas utilized for land application of the swine or other process wastes.**

(cc) "National pollutant discharge elimination system" or "NPDES" means the national system for the issuance of permits under 42 U.S.C. section 1342, and includes any state or interstate program that has been approved by the EPA administrator, in whole or in part, pursuant to 42 U.S.C. section 1342.

(dd) "Nutrient utilization plan for swine" means a written document, on a form prescribed by the secretary of the Kansas department of agriculture, addressing site-specific conditions for the land application of manure, wastewater, and other nutrient sources from swine facilities, at agronomic application rates.

(ee) "Odor control plan for swine" means a written document for swine facilities that summarizes

(yy) "Waste-retention lagoon or pond" means excavated or diked structures, or natural depressions provided for or used for the purpose of containing or detaining swine or other process wastes. Discharges from waste-retention lagoons or ponds shall not be allowed, except as authorized by a water pollution control permit.

(zz) "Waste treatment facilities" means structures or devices that collect, store, stabilize, treat, or otherwise control pollutants, so that after the discharge, disposal, or land application of treated wastes, water pollution will not occur, and the public health and waters of the state will be protected.

(aaa) "Water pollution control permit" means an authorization, license, or equivalent control document issued by the department. A permit shall not include any document that has not yet been the subject of final action by the department, including a draft or proposed permit.

(bbb) "Water quality standards" means Kansas surface water quality standards as defined in K.A.R. 28-16-28b et seq.

**(ccc) "Water well" is as defined in K.S.A. 82a-1203(f), and amendments thereto.**

**(ddd) "Waters of the state" is as defined in K.S.A. 65-161 (a), and amendments thereto.**

(eee) "Wildlife refuge" is as defined in K.S.A. 1997 Supp. 65-171d (c)(6), as amended by L. 1998, ch. 143, sec. 1, and amendments thereto. (Authorized by K.S.A. 1997 Supp. 65-171d, as amended by L. 1998, ch. 143, sec. 1; implementing K.S.A. 1997 Supp. 65-164, K.S.A. 1997 Supp. 65-165, as amended by L. 1998, ch. 62, sec. 1, K.S.A. 65-166, K.S.A. 1997 Supp. 65-166a, K.S.A. 65-170, 65-170b, 65-170c, 65-170d, 65-170g, 65-171a, K.S.A. 1997 Supp. 65-171d, as amended by L.

(b) The swine operator shall provide to the department any information required to ascertain the distance to the nearest habitable structure or determine which habitable structure is the nearest to the proposed or existing confined feeding facility.

(c) The construction of a new swine facility or expansion of an existing swine facility shall comply with the separation distance requirements related to the 100-year floodplain, surface water bodies, private drinking water wells in active use, and publicly owned drinking water wells in active use, pursuant to L. 1998, ch. 143, secs. 4 and 18, and amendments thereto [K.S.A. 1998 Supp. 65-1,180 and 65-1,194, and amendments thereto]. The reference to any freshwater reservoir or pond pursuant to L. 1998, ch. 143, sec. 2, and amendments thereto [K.S.A. 1998 Supp. 65-1,178, and amendments thereto], shall refer only to a freshwater reservoir or pond for which a swine operator has charge or control.

(d) Each swine facility required to have a nutrient utilization plan shall comply with the separation distance requirements related to the sites utilized for the land application of swine or other process wastes, and the presence of any habitable structure, wildlife refuge, or city, county, state or federal park, pursuant to L. 1998, ch. 143, secs. 6, 15 and 18, and amendments thereto [K.S.A. 1998 Supp. 65-1,182, 65-1,192, and 65-1,194, and amendments thereto].

(e) When the animal unit capacity of a confined feeding facility is comprised of swine, in addition

(1) A map identifying the location and layout of the confined feeding facility or the facility perimeter;

(2) a map identifying the location of any habitable structure or city, county, state or federal park within one mile of the confined feeding facility or the facility perimeter;

(3) a map identifying the location of a wildlife refuge within 16,000 feet of the confined feeding facility or the facility perimeter;

(4) a map identifying water wells on the facility property;

(5) a map identifying any streams and bodies of surface water within one mile of the confined feeding facility or the facility perimeter;

(6) for swine facilities that utilize a waste-retention lagoon or pond, the swine operator shall provide to the department any information the operator may possess indicating the presence of any unplugged oil or gas wells located at the proposed or existing swine facility;

(7) for swine facilities with an animal unit capacity of 1,000 animal units or more where the swine at the facility are not owned by the operator at the facility, a copy of the executed contract between the facility operator and owner of the swine, specifying responsibility for management of the manure and wastewater generated at the facility;

(8) for swine facilities with an animal unit capacity of 1,000 animal units or more, the following plans:

(A) Manure management plan;

(B) a nutrient utilization plan, for a facility that applies manure or wastewater to land, as required

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**28-18a-12. *Design and construction of swine waste management and pollution control systems.***

(a) If a confined feeding facility represents a significant water pollution potential or requires a permit, as determined by the department, the operator shall provide a swine waste management or pollution control system that shall be designed in accordance with minimum standards of design, construction, and maintenance and constructed and operated in accordance with construction plans, specifications, and manure management plan approved by the department. If site topography, operating procedures, experience, and other available information indicate that more than the minimum standards of design, construction, and maintenance are required to effect adequate water pollution control, additional provisions may be required. A summary of approved standards of design shall be available from the division.

(b) The operator shall not initiate operation of the new confined feeding facility, swine waste management or pollution control system until after issuance of the new or modified permit by the department. Initiation of construction before the issuance of a new or modified permit by the department shall be deemed to be solely at the risk of the swine operator.

(c) For the purpose of these regulations, any reference to a professional engineer or consultant shall be deemed to designate an individual offering a service for fee for the design of a confined feeding facility, swine waste management system, or pollution control system, exclusive of the nutrient utilization plan, soils or cropping consultations, hydrologic work involved in conducting hydrologic or geologic investigations, or in the siting, design, or construction of groundwater monitoring wells. Any reference to a professional engineer shall be deemed to designate an individual licensed to practice engineering in Kansas by the Kansas state board of technical professions.

(d) Consultants that prepare plans and specifications for the new construction or new expansion of confined feeding facilities that are submitted to KDHE for approval shall provide KDHE with evidence that adequate general commercial liability insurance coverage addressing errors and omissions in the design plans and specifications has been obtained and is in effect.

(e) Each operator shall initiate any proposed new construction or new expansion of a confined feeding facility that has been approved by the department and for which the required permit or permit modification has been issued, within two years of the date on which the permit or permit modification is issued or pursuant to the department's requirements. Each operator shall complete any proposed new construction or new expansion of a confined feeding facility that has been approved by the department and for which the required permit or permit modification is issued, within three years of the date on which the permit or permit modification is issued or as required by the department. Failure to initiate the approved construction or expansion within two years and to complete the approved construction or expansion within

three years of the date of issuance of the permit or permit modification shall void the department's approval of the construction plans, specifications, and other associated plans. In the event that phased construction is proposed, the initiation and completion of construction shall conform to the schedule stipulated in the department's approval. If the department's approval becomes void, the permit or permit modification shall remain in effect for the term of the permit, but the operator shall resubmit the construction plans, specifications, and other associated plans to the department for review and approval before initiating the construction or expansion of a confined feeding facility.

(f) Neither the approval of construction plans, specifications, or the manure management plan, nor the issuance of a permit or certification by the department shall prohibit the department from taking any enforcement action if the swine waste management or pollution control system fails to protect the waters of the state, meet any specified effluent criteria, or comply with state surface water quality standards. In addition, this approval, permit issuance, or certification shall not constitute a defense by the operator regarding violation of any statute, regulation, permit condition, or requirement.

(g) A new confined feeding facility, swine waste management system, or pollution control system shall not be built in any stream, river, lake, reservoir, or water bodies meeting the definition of jurisdictional wetlands consistent with K.A.R. 28-16-28b(ww)(3).

(h) Each operator, when directed by the department, shall notify the department a minimum of two days before performing any soil sample collection activities or liner integrity testing to allow opportunity for department staff to witness the activities.

(i) There shall be no deviation from plans and specifications submitted to and approved by the department, unless amended plans and specifications showing proposed changes have been submitted to and approved by the department.

**(j) Each construction plan shall indicate the location of any active, abandoned, or plugged water, oil, or gas well within 600 feet of any planned location for a waste-retention lagoon or pond. If the operator is unable to confirm the exact location of any well or wells, the construction plan shall contain a note indicating the potential for the well or wells to be located in the vicinity of any proposed lagoon or pond. Any active, abandoned, or plugged water, oil, or gas well that is encountered during construction and that was not identified or located on the construction plan shall be reported to the department within 48 hours of discovery. Construction activities that would impact the well or wells or that would be in the immediate vicinity of the well or wells shall be immediately terminated until the department authorizes the construction to resume.**

(k) Following the completion of construction, each swine operator proposing the construction of a new swine facility or the expansion of an existing swine facility that will utilize a swine waste management or pollution control system shall submit to the department a certification and, when requested, any supporting documentation acknowledging whether or not the swine waste management and pollution

control system was constructed in accordance with the plans and specifications approved by the department. The certification shall be signed either by a professional engineer or an approved consultant representing the operator, who monitored the construction or installation of the swine waste management and pollution control system, including any liner. The certification shall be based on actual observations during construction and any field or laboratory data developed during or following construction. (Authorized by K.S.A. 1997 Supp. 65-171d, as amended by L. 1998, ch. 143, sec. 1, and L. 1998, ch. 143, sec. 5 [K.S.A. 1998 Supp. 65-1,181]; implementing K.S.A. 1997 Supp. 65-164, K.S.A. 1997 Supp. 65-165, as amended by L. 1998, ch. 62, sec. 1, K.S.A. 65-166, K.S.A. 1997 Supp. 65-166a, K.S.A. 1997 Supp. 65-171d, as amended by L. 1998, ch. 143, sec. 1, K.S.A. 65-171h, and L. 1998 ch. 143, sec. 5 [K.S.A. 1998 Supp. 65-1,181]; effective Jan. 15, 1999.)

(f) The dead swine handling plan and any associated records, data, or other information shall be retained at the facility's site office, in a manner that is accessible to inspection by representatives of the department. The operator shall retain, at the facility's site office, the current and previous three years' versions of the plan and any associated records, data, or other information.

(g) A copy of the dead swine handling plan shall be maintained at the facility at a location readily accessible to all employees or contractors who are responsible for implementing the plan.

(h) The disposal of dead swine shall be conducted in conformance with the provisions of, and regulations adopted pursuant to, K.S.A. 47-1201, et seq., and amendments thereto.

(Authorized by K.S.A. 1997 Supp. 65-171d, as amended by L. 1998, ch. 143, sec. 1, and L. 1998, ch. 143, sec. 17 [K.S.A. 1998 Supp. 65-1,188]; implementing K.S.A. 1997 Supp. 65-164, K.S.A. 1997 Supp. 65-165, as amended by L. 1998, ch. 62, sec. 1, K.S.A. 65-166, K.S.A. 1997 Supp. 65-166a, K.S.A. 1997 Supp. 65-171d, as amended by L. 1998, ch. 143, sec. 1, K.S.A. 65-171h, and L. 1998, ch. 143, secs. 14 and 17 [K.S.A. 1998 Supp. 65-1,191 and 65-1,188]; effective Jan. 15, 1999.)

**28-18a-18. Groundwater monitoring for swine facilities. (a) The installation and sampling of groundwater monitoring wells shall be conducted pursuant to L. 1998, ch. 143, secs. 4 and 5, and amendments thereto [K.S.A. 65-1,180 and 65-1,181, and amendments thereto].**

**(b) Any swine facility shall, when required by the department, provide for the installation and sampling of groundwater monitoring wells or the sampling of existing wells in the vicinity of waste-retention lagoons or ponds, waste treatment systems, land application sites, or other areas either known to be or potentially impacted by swine or other process wastes, or where warranted by groundwater, geologic, or construction conditions.**

**(c) Where a groundwater monitoring system is required by the department, the proposed**

location and design of the monitoring wells shall be approved by the department before being constructed.

(d) All water supply or groundwater monitoring wells shall be constructed by a water well contractor or driller licensed in Kansas, in conformance with regulations adopted pursuant to the Kansas groundwater exploration and protection act, K.S.A. 82a-1201 et seq., and amendments thereto.

(e) For the construction of a new swine facility, groundwater monitoring wells shall be sampled and analyzed to establish background concentrations of chemical parameters designated by the department before the facility is populated. For the installation of monitoring wells at existing facilities, each monitoring well shall be monitored within two months of installation to establish a baseline for the chemical parameters designated by the department.

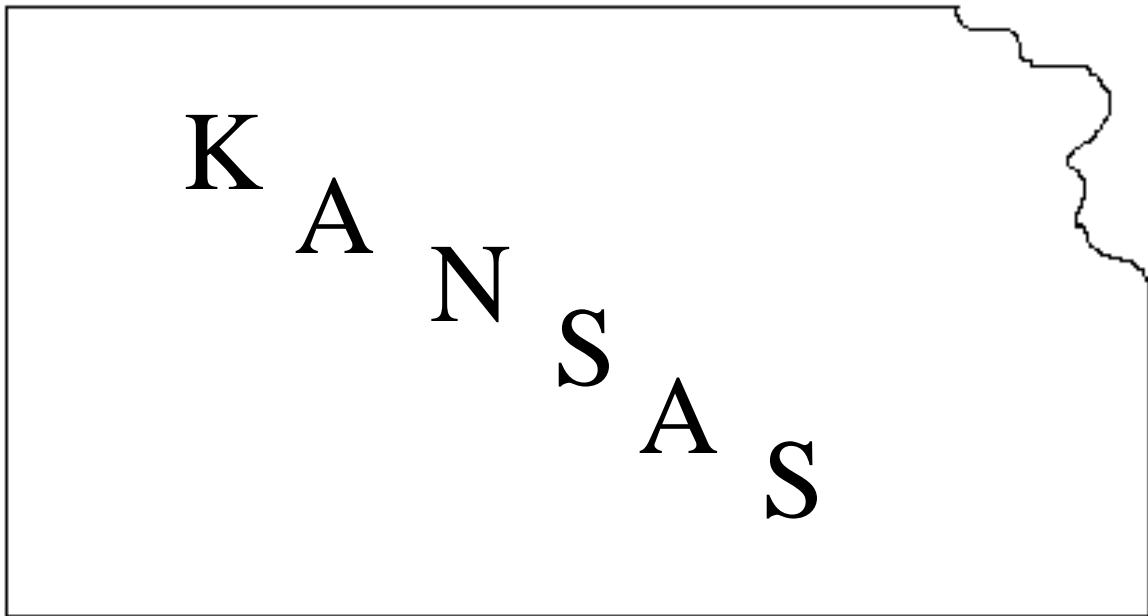
(f) Background, baseline, and other data from monitoring wells shall be maintained for the life of the facility. (Authorized by K.S.A. 1997 Supp. 65-171d, as amended by L. 1998, ch. 143, sec. 1; implementing K.S.A. 1997 Supp. 65-164, K.S.A. 1997 Supp. 65-165, as amended by L. 1998, ch. 62, sec. 1, K.S.A. 65-166, K.S.A. 1997 Supp. 65-166a, K.S.A. 65-169, 65-170, K.S.A. 1997 Supp. 65-171d, as amended by L. 1998, ch. 143, sec. 1, K.S.A. 65-171h, and L. 1998, ch. 143, secs. 4 and 5 [K.S.A. 1998 Supp. 65-1,180 and 65-1,181]; effective Jan. 15, 1999.)

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28-18a-19. *Operation of swine waste management and pollution control systems.* (a) The swine

# **SANITATION ZONE REGULATIONS**

## **WATER WELLS**



**STATE OF KANSAS  
DEPARTMENT OF HEALTH AND  
ENVIRONMENT  
DIVISION OF ENVIRONMENT**

**Topeka, Kansas**



**KANSAS**  
**DEPARTMENT OF HEALTH & ENVIRONMENT**  
BILL GRAVES, GOVERNOR  
Clyde D. Graeber, Secretary

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Dear \_\_\_\_\_ :

Re: KWWC License No. \_\_\_\_\_

Recent oil and gas exploratory holes have encountered strong flows of saltwater (up to 2000 gallons per minute) from depths of 130-160 feet below ground level in an area in Nemaha County. The most recent flow of saltwater originated at a depth of 135 feet, in consolidated sedimentary limestone. The saltwater flows have occurred in the W $\frac{1}{2}$  of section 13-T2S-R14E, Nemaha County.

The purpose of this letter is to inform you of the potential pressurized saltwater flow problem whenever you may have an opportunity to drill test holes or construct or reconstruct a water well within this area of Nemaha and Brown Counties.

Enclosed is a map which defines an area, two townships in size (T2S-R14E, Nemaha County, and T2S-R15E, Brown County), where the Department is establishing the following restrictions to reduce the risk of penetrating a pressurized saltwater zone.

1. You may construct, reconstruct, treat or plug any water well, or test hole within this area, with the stipulation that all holes and borings do not penetrate through the unconsolidated formations (glacial tills, outwash, alluvial and colluvial deposits associated with valley fills),
2. Prior to the drilling of any test hole or the construction or reconstruction of any water well into or below the consolidated strata, underlying the unconsolidated formations, you must first contact this office to obtain approval to proceed. approval may be granted to drill to a specified depth for that specific well site location by researching available water well information in our office. the Department will assist you in determining the maximum depth a boring may be completed to avoid intercepting the pressurized zone. It will be necessary for you to provide the legal location of the well or test hole location, and
3. The Department is requiring that groundwater samples be collected and sent to the Topeka Office for quality analysis. We are requiring at least a quart sample of groundwater be collected and submitted to us from any test holes and all water wells you may construct or reconstruct within the two townships. It is necessary that the collected samples be in our office within a week of collection so that deterioration of the minerals won't occur, thus altering the results of the analysis to reflect inaccurate concentrations. The groundwater samples will assist our effort to monitor the groundwater quality in this area, and to better define the lateral extent of the shallow pressurized saltwater zone.

The regulations which cover the above restrictions and requirements are from amended Article 30 and are as follows:

Section 28-30-6(d). Confined waters shall be separated from each other and from unconfined waters encountered in the same bore hole with grout or other approved materials in areas designated by the department.

Section 28-30-6(1). All groundwater producing zones that are known or suspected to contain natural or man-made pollutants shall be adequately cased and grouted off during completion of the well to prevent the movement of the polluted groundwater to either overlying or underlying fresh groundwater zone.

Section 28-30-4(d). Water samples. Within thirty (30) days after receipt of the water well record (form WWC-5) on a well, the department may request the contractor or landowner who constructs or reconstructs his or her own water well to submit a sample of water from the well for chemical analysis. Insofar as is possible, the department will define in advance, areas from which well water samples are required.

The Department appreciates your support and cooperation concerning this matter and we look forward to working with you. Please contact us if you have any questions concerning this matter.

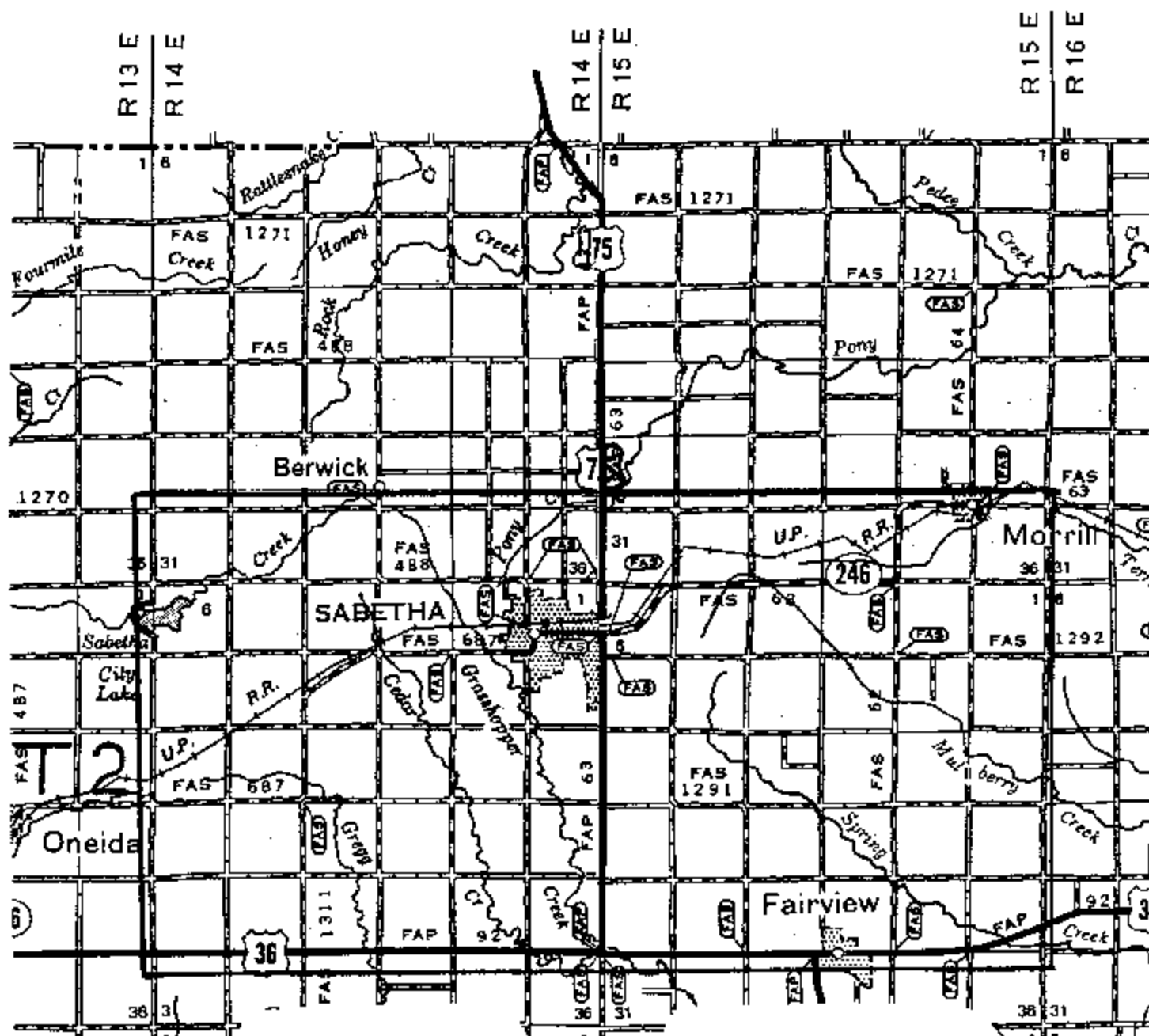
Sincerely,



Richard Harper  
Industrial Programs Section  
Bureau of Water

RH:dig  
Enclosure

DESIGNATED AREA FOR WATER WELL AND TEST HOLE  
DRILLING RESTRICTIONS AND MANDATORY  
GROUNDWATER SAMPLING BECAUSE OF SHALLOW  
PRESSURIZED SALTWATER FLOW ALONG THE  
NEMAHA AND BROWN COUNTY LINE.



NEMAHA COUNTY

BROWN COUNTY

## RESERVOIRS, SANITARY CONDITIONS

**28-10-78.** Appeal and hearing procedures. Appeals of land owners aggrieved by any decision of a reservoir sanitation officer denying approval of plans shall be heard before the chief engineer of the state board of health or his authorized representative. All requests for hearings shall be submitted in writing to the chief engineer of the state board of health within 20 days after denial of a sanitation plan by the reservoir sanitation officer. The chief engineer shall set a date for the hearing within 15 days after receipt of the request. The landowner shall set forth in his request the main points wherein he is aggrieved by the decision of the reservoir sanitation officer. The landowner and the reservoir sanitation officer shall be heard at the hearing and all testimony shall be recorded on tape. The testimony will not be transcribed unless future court action is involved. Within 10 days after the hearing the chief engineer of the state board of health shall render a decision approving, modifying or overruling the decision of the reservoir sanitation officer and shall notify the landowner and the reservoir sanitation officer in writing of his decision. (Authorized by K.S.A. 1969 Supp. 65-187; effective Jan. 1, 1970.)

**28-10-79.** Submission and approval of sanitation plans. Three copies of all sanitation plans required by the sanitation zone law - K.S.A. 1969 Supp. 65-184 through 65-189 shall be submitted to the reservoir sanitation officer of the sanitation zone in which the land is located. The reservoir sanitation officer shall forward copies of all sanitation plans serving subdivisions, two or more lots, two or more family dwelling units, and any commercial or public building to the state department of health for approval. Following approval by the department the reservoir sanitation officer shall review the plans for compliance with local requirements and approve or disapprove them. All sanitation plans shall show both plan and profile views of all major structures. The drawings shall be drawn to a suitable scale, on standard 17 x 22 inch sheets or larger. If larger size sheets are used they shall be placed in folders suitable for storage in standard 8 ½ x 11 file cabinets.

An engineering report or narrative, fully describing and explaining the design and plan for operation of the facilities, shall accompany each sanitation plan serving two or more lots or properties.

A receipt showing payment of the required fee to the county treasurer shall be attached to each sanitation plan submitted to the reservoir sanitation officer. Sanitation plans that include water and/or sewerage systems that serve (a) two or more lots, (b) two or more services such as multi-family dwellings, trailer parks, mobile home parks and (c) non-residential facilities open to the public shall not be approved by the reservoir sanitation officer until the plans have been reviewed by the state department of health and the department has certified to the reservoir sanitation officer that these public systems are acceptable and approved. (Authorized by K.S.A. 1969 Supp. 65-187 and 65-189c; effective Jan. 1, 1970)

**28-10-80.** Requirements for subdivision of land.

(a) *Approved plats.* Any land, located within a sanitation zone, that is subdivided into two or more lots, must be platted, and approved by the board of county commissioners.

(b) *Preliminary engineering study and cost estimate.* Owners of land within a sanitation zone desiring to subdivide their land into ten or less lots, shall file with the reservoir sanitation officer, three copies of the required engineering study which shall include all the data and information required for approval of the sanitation plan such as, but not limited to, the location and results of any exploratory drilling operations undertaken to determine the availability and quality of ground water, if private wells are to be used as a

source of water supply; the location and results of all soil testing undertaken to determine the suitability of the soil for use of septic tank-tile field systems, if such systems are proposed for disposal of sewage; statements from purveyors of services specified in the plan, such as refuse collection, pumping out of septic tanks, or hauling of water, indicating their ability and willingness to provide the specified service under a bonded contract; and maps of the subdivision showing location of all existing or proposed water and sewer lines, if such public systems are to be provided.

Owners of land located within a sanitation zone desiring to sub-divide their land into more than ten (10) lots shall file with the reservoir sanitation officer three copies of the proposed plat, the required preliminary engineering report, plan and cost estimate for providing water, sewerage and refuse disposal service. The preliminary engineering report, plan and cost estimate shall be prepared by a licensed professional engineer and an imprint of his professional engineer's seal shall be placed on all copies of the engineering report, plan and cost estimate.

The preliminary engineering plan shall contain sealed and dimensioned drawings of the subdivision or plat showing location of all lot lines, proposed and existing streets, rights of way and easements; water mains, storage tanks, sewers, manholes, lift station, and treatment plants and the topography of the plat by means of appropriate contour maps.

The engineering report shall discuss the proposed development in detail, giving all pertinent facts used in developing the preliminary engineering plans, including plan of operation and a cost analysis for the construction and operation of the sanitation facilities and services.

The cost estimate shall be broken down into classes of work to be performed and shall show estimated quantities of each type of work and per unit cost.

The reservoir sanitation officer shall forward all copies of the plat, preliminary engineering plans, engineering report, and cost estimates to the state department of health for review and approval. The reservoir sanitation officer shall include in his letter of transmittal, or append to it, any additional information he believes the department should consider in its review of the plans and reports. Following review of the preliminary engineering plan the department shall advise the reservoir sanitation officer as to the acceptability of the preliminary plans.

(c) *Final engineering plans and specifications.* Approval of the preliminary engineering plans by the department shall in no way be considered official approval of the final plans required by law for all public water supply and sewerage systems. Such final plans and specifications shall be submitted directly to the state department of health by the consulting engineer and no construction of such systems shall be started or contracts let for such construction until the final plans and specifications are approved. The department shall inform the reservoir sanitation officer of its approval of any plans and specifications for a public water supply and/or sewerage system located within a sanitation zone. (Authorized by K.S.A. 1969 Supp. 65-187, 65-189c, and 65-189d; effective Jan. 1, 1970.)

**28-10-81.** Requirements for construction. The sanitation plan shall be submitted to, and approved by the reservoir sanitation officer prior to starting construction of any buildings on land located within a sanitation zone except the following: Single family residences located on lots containing 3 acres or more of land exclusive of roads, streets and other public rights-of-way and buildings used for agricultural purpose as defined in the act. (Authorized by K.S.A 1969 Supp. 65-187 and 65-189c; effective Jan. 1, 1970.)

**28-10-82.** Requirements for sale or contract to sell land within sanitation zone. Every developer selling by deed or contract lots or tracts of land within any subdivision located in a sanitation zone shall furnish the sanitation officer with a copy of the informational statement he proposes to insert in the deed or sales contract for any lot he sells as required by the act.

Owners, other than developers, shall furnish the reservoir sanitation officer with a copy of the statement they have included in the deed or sales contract for any land they have sold within a sanitation zone. Such copy shall be filed with the reservoir sanitation officer within ten days after execution of any sales contract or conveyance of title. (Authorized by K.S.A. 1969 Supp. 65-187 and 65-189c; effective Jan. 1, 1970.)

**28-10-83.** Duties of reservoir sanitation officer. The reservoir sanitation officer shall (1) accept, review, and approve or disapprove all sanitation plans in accordance with procedures set forth in the act and in these regulations, (2) report all violations of the law and the rules and regulations to the county attorney, (3) keep complete and accurate records of all correspondence and actions taken in connection with the acceptance, review and approval of sanitation plans, subdivision plats, sale of lots and inspection of sanitation facilities, (4) furnish the state department of health with a quarterly report listing the following: All properties for which a sanitation plan has been received and the status of such plan; all properties where construction has been started; all properties where construction has been completed; all subdivisions for which plats have been filed and the status of the plat; and all fees paid into the county treasurer by owners for sanitation plan review and inspection service, (5) make inspections of construction of facilities approved to assure compliance with the sanitation plan (these inspections shall be made jointly with representatives of the state department of health whenever a public water or sewer system is involved); and (6) consult with the state department of health when any unusual or special problems arise. (Authorized by K.S.A. 1969 Supp. 65-187 and 65-189c; effective Jan. 1, 1970.)

**28-10-84.** Fees for examination of sanitation plans and inspection of construction. Each sanitation plan submitted to the reservoir sanitation officer for review and approval shall have attached a receipt showing payment to the county treasurer of the county in which the lot or building site is located, the appropriate fee set forth below. The reservoir sanitation officer shall not accept any sanitation plan until such receipt of payment is attached.

<u>Type of property served by sanitation plan</u>	<u>Amount of Fee</u>
A single-family dwelling or cabin . . . . .	\$ 25.00
A duplex or apartment serving two families . . . . .	50.00*
A commercial building, trailer park, etc. . . . .	100.00
An industrial development . . . . .	100.00
A multiple lot housing development or subdivision . . . . .	100.00

\*An additional \$10.00 shall be charged for each additional family unit.

Fee shall not be refunded but plans may be revised and resubmitted upon payment of a resubmission fee of five dollars (\$5.00). (Authorized by K.S.A. 169 Supp. 65-187; effective Jan. 1, 1970.)

**28-10-85.** Preparation of sanitation plans.

(a) *General.* All sanitation plans shall include plans for the delivery of water, the collection, treatment and/or disposal of sewage, and the disposal of refuse. All sanitation plans shall be submitted to the reservoir sanitation officer for review and approval; following payment of appropriate fee to the county treasurer.

(b) *Specific requirements for sanitation plans for systems serving subdivisions containing ten or less lots.* Sanitation plans for subdivisions containing ten or less lots shall (1) be full and complete with all functional details shown in both plan and profile, (2) be drawn to appropriate scale to show details, and (3) be fully dimensioned. If the plan includes the construction and installation of a complex structure the reservoir sanitation officer, upon advice of the state department of health, may require the plans to be prepared and the construction supervised by a licensed professional engineer.

(c) *Specific requirements for sanitation plans for systems serving subdivisions containing more than ten (10) lots.* The sanitation plan shall be developed and the engineering studies shall be prepared by a licensed professional engineer. (Authorized by K.S.A. 1969 Supp. 65-187 and 65-189c; effective Jan. 1, 1970.)

**28-10-86.** Acceptable methods for providing water.

(a) *General requirements.* Properties abutting on a public water system operated by a city, a water district or a public water utility will be required to use such supply unless an exception as provided for in law is granted by the department.

(b) *Single family use.* Whenever water service from an existing public water supply is not available, or cannot be made available at a reasonable cost to a lot that is to be used as a building site for a single family dwelling, an on-site drilled or driven well may be used. If a public water supply is not available and a well cannot be developed, a storage tank may be used. Such well or storage tank shall be located and constructed in conformity with standards set forth in part C of these regulations and the plans and specifications for such well or storage tank shall be filed with and approved by the reservoir sanitation officer.

(c) *Multi-family use.* When the water supply is to serve two or more lots, or multi-family dwellings on a single lot, or a trailer park, motel, or any other commercial establishment serving multi-family groups, and an existing public water supply system is not available, or cannot be made available at reasonable cost, a drilled or driven well constructed and located with the guidance of the recommended practices of the state department of health set forth in their bulletin "Recommendations for Public Water Well Location, Construction and Disinfection," a copy of which is on file with revisor of statutes, may be used. The plans must be submitted to and approved by the state department of health. Submission to the state department of health shall be made by the reservoir sanitation officer. (Authorized by K.S.A. 1969 Supp. 65-187; effective Jan. 1, 1970.)

**28-10-87.** Acceptable methods of disposing of sewage.

(a) *General.* Whenever sewerage service is available from a public sewerage system, or can be

made available at a reasonable cost to a lot, the sanitation plan for such lot shall provide for connection to such public sewerage system.

(b) *For single family dwellings.* Whenever sewerage service is not available by means of a public sewer, and cannot be made available at a reasonable cost, sewage from such dwellings may be disposed of by means of a properly located and constructed septic tank-tile field system, provided the lot meets the requirements for use of such systems set forth in part C of these regulations.

If the lot does not meet the requirements for use of a septic tank-tile field system, a septic tank sand filter system, or a waste stabilization pond, then a properly designed and constructed holding tank may be used, if (1) a reliable method for pumping out the tanks and transporting the pumpings to a sewage treatment plant approved by the state department of health is provided, and (2) a surety bond guaranteeing provision of the pumping service is deposited with the reservoir sanitation officer.

The amount of the performance bond shall be set by the board of county commissioners. The performance bond shall not be required if the service is provided by a duly constituted sewer district or a similarly constituted public authority. Other methods may be used if written approval for such use is obtained from the department.

(c) *For multi-family use.* Whenever sewerage service for a multi-family dwelling, a commercial building, trailer park, or mobile home park is not available by means of a public sewerage system, and cannot be made available at a reasonable cost, a private sewerage system that provides: (1) adequate and reliable means for treating the sewage, (2) a satisfactory point for discharge or disposal of the treated sewage, and (3) a reliable plan of operation, may be used. (Authorized by K.S.A. 1969 Supp. 65-187; effective Jan. 1, 1970.)

#### **28-10-88.** Acceptable refuse handling practices.

(a) *Storage at single family dwellings.* Garbage and trash shall be stored in metal or plastic containers of ample size provided with tight fitting lids. Ring stands, racks, posts or similar devices shall be provided that will hold the cans in place and prevent their being overturned by animals or wind.

(b) *Storage at multi-family dwellings, commercial establishments, trailer parks, etc.* Garbage and trash shall be stored in standard galvanized garbage cans; in Dempster-Dumpster bulk containers or similar metal containers with tight fitting lids or covers.

(c) *Refuse collection at single family dwellings.* The refuse shall be removed from the premises at least once each week and transported to the disposal site in the storage container or in an approved type truck such as a van, or packer-type refuse collection vehicle.

Whenever refuse collection and disposal service is available through a community sponsored collection system, owners of single family residences shall use such community collection service.

Whenever a community sponsored or similar organized refuse collection service is not available, owners of single family dwellings may contract with a private collector for collection of refuse provided the collector is approved by the reservoir sanitation officer to collect refuse, or the owner may take his own refuse to the disposal site if he does it in a manner that will prevent the littering of the highway or roads and the escape of offensive odors. Transportation of the refuse in the storage containers may be permitted if the lids are kept tightly fitted over the cans.

(d) *Refuse collection at multi-family dwellings, commercial establishments, trailer parks, etc.* All refuse shall be removed from the storage containers weekly or more often if necessary and transported to the disposal site in a closed vehicle. Whenever this type of service is provided and available from a

community sponsored refuse collection system, such service shall be used by owners of these kind of developments.

Whenever service is not available from a community operated refuse collection system, the owner may contract with a private collector for collection of the refuse, provided the collector is certified by the reservoir sanitation officer to collect refuse.

*(e) Disposal of refuse.* All refuse collected at or removed from any property within a sanitation zone shall be transported to and disposed in an existing disposal site. No new disposal site shall be started in any sanitation zone without the approval of the location and plan of operation by the state department of health.

Owners of single family dwellings, located in isolated areas where a community collection service is not available may be permitted to use properly located and designed burial pits. Such burial pits shall not be used for any type of development other than a single family dwelling. (Authorized by K.S.A. 1969 Supp. 65-187; effective Jan. 1, 1970.)

**28-10-89 to 28-10-99.** Reserved for future use.

### C. Standards

**28-10-100.** Water supply requirements and standards for supplies serving two or more properties, two or more families, and/or the general public.

*(a) Permits and certificates.* Every city, water district, improvement district, or other public agency that provides or proposes to provide a water supply system to serve two or more single family dwellings or any establishment open to the general public located within a sanitation zone shall obtain a water supply permit from the state department of health as required in K.S.A. 65-163 prior to constructing any such system in a sanitation zone.

Any private individual, company or corporation providing or proposing to provide a water supply system to serve two or more properties, two or more single family dwellings, or any establishment open to the general public, any of which are located within a sanitation zone, shall obtain a certificate of convenience from the corporation commission as required in K.S.A. 66-104 and a water supply permit from the state department of health as required by K.S.A. 65-163.

*(b) Construction.* All water supplies serving two or more properties, two or more families, and/or the general public, shall be located, constructed, and operated in conformity with the provisions of Bulletin 1-6 "Policies Governing the Design of Public Water Supply Systems," published by the state department of health, and the department's "Recommended Standards for Location, Construction and Disinfection of Wells Used for Public Water Supplies," copies of which are on file with the revisor of statutes, unless the department finds that compliance with any specific requirement is unnecessary in a particular situation and so informs the reservoir sanitation officer and the owner in writing. (Authorized by K.S.A. 1969 Supp. 65-187; effective, E-68-23, Aug. 9, 1968; effective, E-69-6, Jan. 8, 1969; effective Jan. 1, 1970.)

**28-10-101.** Drilled or driven wells used as a water supply for a single family dwelling. Drilled and driven wells used as a source of water supply for single family dwelling shall meet the following standards:

*(a) Minimum distance from sources of contamination.* The well shall be separated from sources of contamination by distances equal to, or greater than those shown in Table I.

TABLE I

Area	Minimum Separation
Subsurface absorption field for septic tank effluent	50 feet
Pit privy	50 feet
Septic tank	50 feet
Barnyards, stables, manure piles, animal pens, etc.	50 feet
Streams, lakes and ponds	25 feet
Sewer lines, unless constructed of cast iron or other equally tight construction	50 feet
Sewer lines constructed of cast iron or other equally tight construction	10 feet

(b) *Protection against contamination.* Every well used as a source of water supply for a single family dwelling shall be located at least 25 feet from the property line of the lot and the lot owner shall not permit any portion of the lot to be used for any purpose that will create any condition that is dangerous to the water supply.

(c) *Casing.* All wells shall be cased with durable water-tight casing to a depth of 10 feet or to the top of the impervious formation above the water-bearing formation, whichever is the greater. The top ten feet of the casing shall be fabricated of wrought iron, steel, NSF approved polyvinyl chloride plastic or other NSF approved materials and shall comply with the weight and thickness specifications given in Table II.

TABLE II  
Minimum standards of dimensions and weights  
for wrought iron or steel well casing

Normal Size in inches	Wall thickness in inches	Weight in lbs. per foot of pipe	
		plain ends	thread and coupling
3 ½	0.125	4.51	4.60
4	0.134	5.53	6.65
4 ½	0.142	6.61	6.75
5 ½	0.154	8.79	9.00
6	0.164	10.22	10.50
8 ¾	0.188	16.90	17.50

Minimum standards of dimensions and weights for polyvinyl  
chloride (PVC) plastic pipe

Nominal Size	Wall thickness in inches	Weight in lbs. per foot
4 inches	0.237	1.364
6 inches	0.280	2.403

No used, reclaimed, rejected, or contaminated pipe shall be used for casing any well. New pipe, pulled from water well test holes immediately following completion of drilling operation, shall not be considered "used or contaminated." The casing of all wells shall project at least 6 inches above the floor of the pump house or finished ground grade, and at least 24 inches above the highest flood level of record. No casing shall be cut off below ground surface except to install a pitless adapter. The adapter shall extend at least 12 inches above the ground surface. No opening shall be made in the casing below the finished ground surface or the pump house floor except for installation of a pitless adapter unit so designed and fabricated as to prevent soil or water from entering the well. The outside casing shall not be used as a suction pipe for the pump. The casings of wells developed in rock shall be firmly seated in sound rock. If broken or creviced rock formation is encountered above the aquifer the casing should be extended through the creviced formation and seated in sound rock or impervious formation. The diameter of the top 10 feet of the drill hole shall be at least 4 inches larger than the outside diameter of the casing and this annular space shall be filled with cement grout or puddled clay.

(d) *Sanitary seal.* The top of the well casing shall be tightly sealed into the base of the pump, or a commercial sanitary well seal, designed to prevent surface water, soil and vermin from entering the well, shall be provided.

(e) *Temporary plugs.* The top of all well casings shall be tightly plugged or capped to prevent contamination of the well whenever it is not possible to install the pumping equipment and the permanent seal immediately following installation of the casing.

(f) *Pumping equipment.* Submersible turbine, ejector, horizontal turbine, or water lubricated positive displacement pumping equipment shall be used for lifting water from wells. If other types of pumping equipment are to be used, written approval for their use shall be obtained from the state department of health. Approval in a specific instance shall not be construed as general approval.

(g) *Pump mounting.* All pumps installed directly over wells shall be mounted on the well casing, the pump foundation, or the pump stand in a manner that will provide an effective water-tight seal around the top of the casing. This requirement shall be deemed satisfied if the casing is extended into the pump base one inch, provided the pump is mounted on a base plate or foundation in such a manner as to exclude dust and insects, and the top of the well casing is at least two feet above the highest known flood water level. When the pump is not mounted directly over the well and the pump suction pipe emerges from the top of the casing, a water-tight sanitary well seal shall be provided between the suction pipe and the casing. A similar water-tight seal shall be provided for the cable conduit when submersible pumps are used.

(h) *Construction plans.* Plates shown in Kansas state department of health bulletin No. 4-1, "Manual of Recommended Practice for Locating, Constructing and Equipping Water Wells for Rural Homes," may be used as aids in preparing plans for submission to the reservoir sanitation officer if they accurately show the construction to be provided. (Authorized by K.S.A. 1969 Supp. 65-187; effective, E-68-23, Aug. 9, 1968; effective, E-69-6, Jan. 8, 1969; effective Jan. 1, 1970.)

## **CEDAR BLUFF RESERVOIR SANITATION ZONE**

Boundaries of Cedar Bluff reservoir sanitation zone. (Official map filed revisor of statutes, Topeka, and register of deeds in affected counties.) The boundaries of the Cedar Bluff reservoir sanitation zone are hereby set and established as shown on the *official* map drawing **69-1** approved by the Kansas state board of health: *Provided*, That no land located within the corporate limits of the city located within the boundaries, *or any land subject to a county sanitary code which contains provisions for the control of sewage disposal, water supplies and refuse handling practices and is adopted under the provisions of K.S.A. 19-3701 through 19-3708* shall be considered to be a park of the sanitation zone or subject to any sanitation zone or subject to any sanitation zone regulations. (Authorized by K.S.A. 1969 Supp. 65-187; effective E-68-23, Aug. 9, 1968; effective Jan. 1, 1969; amended Jan. 1, 1970.)

## **CHENEY RESERVOIR SANITATION ZONE**

Boundaries of Cheney reservoir sanitation zone. (Official map filed revisor of statutes, Topeka, and register of deeds in affected counties.) The boundaries of the Cheney reservoir sanitation zone are hereby set and established as shown on the official map drawing **69-2** approved by the Kansas state board of health: *Provided*, That no land located within the corporate limits of the city located within the boundaries, *or any land subject to a county sanitary code which contains provisions for the control of sewage disposal, water supplies and refuse handling practices and is adopted under the provisions of K.S.A. 19-3701 through 19-3708* shall be considered to be a park of the sanitation zone or subject to any sanitation zone or subject to any sanitation zone regulations. (Authorized by K.S.A. 1969 Supp. 65-187; effective E-68-23, Aug. 9, 1968; effective Jan. 1, 1969; amended Jan. 1, 1970.)

## **COUNCIL GROVE RESERVOIR SANITATION ZONE**

Boundaries of Council Grove reservoir sanitation zone. (Official map filed revisor of statutes, Topeka, and register of deeds in affected counties.) The boundaries of the Council Grove reservoir sanitation zone are hereby set and established as shown on the official map drawing **69-3** approved by the Kansas state board of health: *Provided*, That no land located within the corporate limits of the city located within the boundaries, *or any land subject to a county sanitary code which contains provisions for the control of sewage disposal, water supplies and refuse handling practices and is adopted under the provisions of K.S.A. 19-3701 through 19-3708* shall be considered to be a park of the sanitation zone or subject to any sanitation zone or subject to any sanitation zone regulations. (Authorized by K.S.A. 1969 Supp. 65-187; effective E-68-23, Aug. 9, 1968; effective Jan. 1, 1969; amended Jan. 1, 1970.)

## **ELK CITY RESERVOIR SANITATION ZONE**

Boundaries of Elk City reservoir sanitation zone. (Official map filed revisor of statutes, Topeka, and register of deeds in affected counties.) The boundaries of the Elk City reservoir sanitation zone are hereby set and established as shown on the official map drawing **69-18** approved by the Kansas state board of health: *Provided*, That no land located within the corporate limits of the city located within the boundaries,

*or any land subject to a county sanitary code which contains provisions for the control of sewage disposal, water supplies and refuse handling practices and is adopted under the provisions of K.S.A. 19-3701 through 19-3708 shall be considered to be a park of the sanitation zone or subject to any sanitation zone or subject to any sanitation zone regulations. (Authorized by K.S.A. 1969 Supp. 65-187; effective E-68-23, Aug. 9, 1968; effective Jan. 1, 1969; amended Jan. 1, 1970.)*

## **GLEN ELDER RESERVOIR SANITATION ZONE**

Boundaries of Glen Elder reservoir sanitation zone. (Official map filed revisor of statutes, Topeka, and register of deeds in affected counties.) The boundaries of the Glen Elder reservoir sanitation zone are hereby set and established as shown on the official map drawing **69-5** approved by the Kansas state board of health: *Provided*, That no land located within the corporate limits of the city located within the boundaries, *or any land subject to a county sanitary code which contains provisions for the control of sewage disposal, water supplies and refuse handling practices and is adopted under the provisions of K.S.A. 19-3701 through 19-3708 shall be considered to be a park of the sanitation zone or subject to any sanitation zone or subject to any sanitation zone regulations. (Authorized by K.S.A. 1969 Supp. 65-187; effective E-68-23, Aug. 9, 1968; effective Jan. 1, 1969; amended Jan. 1, 1970.)*

## **FALL RIVER RESERVOIR SANITATION ZONE**

Boundaries of Fall City reservoir sanitation zone. (Official map filed revisor of statutes, Topeka, and register of deeds in affected counties.) The boundaries of the Fall City reservoir sanitation zone are hereby set and established as shown on the official map drawing **69-4** approved by the Kansas state board of health: *Provided*, That no land located within the corporate limits of the city located within the boundaries, *or any land subject to a county sanitary code which contains provisions for the control of sewage disposal, water supplies and refuse handling practices and is adopted under the provisions of K.S.A. 19-3701 through 19-3708 shall be considered to be a park of the sanitation zone or subject to any sanitation zone or subject to any sanitation zone regulations. (Authorized by K.S.A. 1969 Supp. 65-187; effective E-68-23, Aug. 9, 1968; effective Jan. 1, 1969; amended Jan. 1, 1970.)*

## **KANOPOLIS RESERVOIR SANITATION ZONE**

Boundaries of Kanopolis reservoir sanitation zone. (Official map filed revisor of statutes, Topeka, and register of deeds in affected counties.) The boundaries of the Kanopolis reservoir sanitation zone are hereby set and established as shown on the official map drawing **69-7** approved by the Kansas state board of health: *Provided*, That no land located within the corporate limits of the city located within the boundaries, *or any land subject to a county sanitary code which contains provisions for the control of sewage disposal, water supplies and refuse handling practices and is adopted under the provisions of K.S.A. 19-3701 through 19-3708 shall be considered to be a park of the sanitation zone or subject to any sanitation zone or subject to any sanitation zone regulations. (Authorized by K.S.A. 1969 Supp. 65-187; effective E-68-23, Aug. 9, 1968; effective Jan. 1, 1969; amended Jan. 1, 1970.)*

## **JOHN REDMOND RESERVOIR SANITATION ZONE**

Boundaries of John Redmond reservoir sanitation zone. (Official map filed revisor of statutes, Topeka, and register of deeds in affected counties.) The boundaries of the John Redmond reservoir sanitation zone are hereby set and established as shown on the official map drawing **69-6** approved by the Kansas state board of health: *Provided*, That no land located within the corporate limits of the city located within the boundaries, *or any land subject to a county sanitary code which contains provisions for the control of sewage disposal, water supplies and refuse handling practices and is adopted under the provisions of K.S.A. 19-3701 through 19-3708* shall be considered to be a park of the sanitation zone or subject to any sanitation zone or subject to any sanitation zone regulations. (Authorized by K.S.A. 1969 Supp. 65-187; effective E-68-23, Aug. 9, 1968; effective Jan. 1, 1969; amended Jan. 1, 1970.)

## **KIRWIN RESERVOIR SANITATION ZONE**

Boundaries of Kirwin reservoir sanitation zone. (Official map filed revisor of statutes, Topeka, and register of deeds in affected counties.) The boundaries of the Kirwin reservoir sanitation zone are hereby set and established as shown on the official map drawing **69-8** approved by the Kansas state board of health: *Provided*, That no land located within the corporate limits of the city located within the boundaries, *or any land subject to a county sanitary code which contains provisions for the control of sewage disposal, water supplies and refuse handling practices and is adopted under the provisions of K.S.A. 19-3701 through 19-3708* shall be considered to be a park of the sanitation zone or subject to any sanitation zone or subject to any sanitation zone regulations. (Authorized by K.S.A. 1969 Supp. 65-187; effective E-68-23, Aug. 9, 1968; effective Jan. 1, 1969; amended Jan. 1, 1970.)

## **LOVEWELL RESERVOIR SANITATION ZONE**

Boundaries of Lovewell reservoir sanitation zone. (Official map filed revisor of statutes, Topeka, and register of deeds in affected counties.) The boundaries of the Lovewell reservoir sanitation zone are hereby set and established as shown on the official map drawing **69-9** approved by the Kansas state board of health: *Provided*, That no land located within the corporate limits of the city located within the boundaries, *or any land subject to a county sanitary code which contains provisions for the control of sewage disposal, water supplies and refuse handling practices and is adopted under the provisions of K.S.A. 19-3701 through 19-3708* shall be considered to be a park of the sanitation zone or subject to any sanitation zone or subject to any sanitation zone regulations. (Authorized by K.S.A. 1969 Supp. 65-187; effective E-68-23, Aug. 9, 1968; effective Jan. 1, 1969; amended Jan. 1, 1970.)

## **MARION RESERVOIR SANITATION ZONE**

Boundaries of Marion reservoir sanitation zone. (Official map filed revisor of statutes, Topeka, and register of deeds in affected counties.) The boundaries of the Marion reservoir sanitation zone are hereby set and established as shown on the official map drawing **69-19** approved by the Kansas state board of health: *Provided*, That no land located within the corporate limits of the city located within the boundaries, *or any*

*land subject to a county sanitary code which contains provisions for the control of sewage disposal, water supplies and refuse handling practices and is adopted under the provisions of K.S.A. 19-3701 through 19-3708 shall be considered to be a park of the sanitation zone or subject to any sanitation zone or subject to any sanitation zone regulations. (Authorized by K.S.A. 1969 Supp. 65-187; effective E-68-23, Aug. 9, 1968; effective Jan. 1, 1969; amended Jan. 1, 1970.)*

## **CLINTON RESERVOIR SANITATION ZONE**

Boundaries of Clinton reservoir sanitation zone. (Official map filed revisor of statutes, Topeka, and register of deeds in affected counties.) The boundaries of the Clinton reservoir sanitation zone are hereby set and established as shown on the official map drawing **69-21** approved by the Kansas state board of health: *Provided, That no land located within the corporate limits of the city located within the boundaries, or any land subject to a county sanitary code which contains provisions for the control of sewage disposal, water supplies and refuse handling practices and is adopted under the provisions of K.S.A. 19-3701 through 19-3708 shall be considered to be a park of the sanitation zone or subject to any sanitation zone or subject to any sanitation zone regulations. (Authorized by K.S.A. 1969 Supp. 65-187; effective E-68-23, Aug. 9, 1968; effective Jan. 1, 1969; amended Jan. 1, 1970.)*

## **MELVERN RESERVOIR SANITATION ZONE**

Boundaries of Melvern reservoir sanitation zone. (Official map filed revisor of statutes, Topeka, and register of deeds in affected counties.) The boundaries of the Melvern reservoir sanitation zone are hereby set and established as shown on the official map drawing **69-20** approved by the Kansas state board of health: *Provided, That no land located within the corporate limits of the city located within the boundaries, or any land subject to a county sanitary code which contains provisions for the control of sewage disposal, water supplies and refuse handling practices and is adopted under the provisions of K.S.A. 19-3701 through 19-3708 shall be considered to be a park of the sanitation zone or subject to any sanitation zone or subject to any sanitation zone regulations. (Authorized by K.S.A. 1969 Supp. 65-187; effective E-68-23, Aug. 9, 1968; effective Jan. 1, 1969; amended Jan. 1, 1970.)*

## **FORT SCOTT RESERVOIR SANITATION ZONE**

Boundaries of Fort Scott reservoir sanitation zone. (Official map filed revisor of statutes, Topeka, and register of deeds in affected counties.) The boundaries of the Fort Scott reservoir sanitation zone are hereby set and established as shown on the official map drawing **69-22** approved by the Kansas state board of health: *Provided, That no land located within the corporate limits of the city located within the boundaries, or any land subject to a county sanitary code which contains provisions for the control of sewage disposal, water supplies and refuse handling practices and is adopted under the provisions of K.S.A. 19-3701 through 19-3708 shall be considered to be a park of the sanitation zone or subject to any sanitation zone or subject to any sanitation zone regulations. (Authorized by K.S.A. 1969 Supp. 65-187; effective E-68-23, Aug. 9, 1968; effective Jan. 1, 1969; amended Jan. 1, 1970.)*

## MILFORD RESERVOIR SANITATION ZONE

Boundaries of Milford reservoir sanitation zone. (Official map filed revisor of statutes, Topeka, and register of deeds in affected counties.) The boundaries of the Milford reservoir sanitation zone are hereby set and established as shown on the official map drawing **69-10** approved by the Kansas state board of health: *Provided, That no land located within the corporate limits of the city located within the boundaries, or any land subject to a county sanitary code which contains provisions for the control of sewage disposal, water supplies and refuse handling practices and is adopted under the provisions of K.S.A. 19-3701 through 19-3708 shall be considered to be a park of the sanitation zone or subject to any sanitation zone or subject to any sanitation zone regulations.* (Authorized by K.S.A. 1969 Supp. 65-187; effective E-68-23, Aug. 9, 1968; effective Jan. 1, 1969; amended Jan. 1, 1970.)

## PERRY RESERVOIR SANITATION ZONE

Boundaries of Perry reservoir sanitation zone. (Official map filed revisor of statutes, Topeka, and register of deeds in affected counties.) The boundaries of the Perry reservoir sanitation zone are hereby set and established as shown on the official map drawing **69-17** approved by the Kansas state board of health: *Provided, That no land located within the corporate limits of the city located within the boundaries, or any land subject to a county sanitary code which contains provisions for the control of sewage disposal, water supplies and refuse handling practices and is adopted under the provisions of K.S.A. 19-3701 through 19-3708 shall be considered to be a park of the sanitation zone or subject to any sanitation zone or subject to any sanitation zone regulations.* (Authorized by K.S.A. 1969 Supp. 65-187; effective E-68-23, Aug. 9, 1968; effective Jan. 1, 1969; amended Jan. 1, 1970.)

## NORTON RESERVOIR SANITATION ZONE

Boundaries of Norton reservoir sanitation zone. (Official map filed revisor of statutes, Topeka, and register of deeds in affected counties.) The boundaries of the Norton reservoir sanitation zone are hereby set and established as shown on the official map drawing **69-11** approved by the Kansas state board of health: *Provided, That no land located within the corporate limits of the city located within the boundaries, or any land subject to a county sanitary code which contains provisions for the control of sewage disposal, water supplies and refuse handling practices and is adopted under the provisions of K.S.A. 19-3701 through 19-3708 shall be considered to be a park of the sanitation zone or subject to any sanitation zone or subject to any sanitation zone regulations.* (Authorized by K.S.A. 1969 Supp. 65-187; effective E-68-23, Aug. 9, 1968; effective Jan. 1, 1969; amended Jan. 1, 1970.)

## POMONA RESERVOIR SANITATION ZONE

Boundaries of Pomona reservoir sanitation zone. (Official map filed revisor of statutes, Topeka, and register of deeds in affected counties.) The boundaries of the Pomona reservoir sanitation zone are hereby set and established as shown on the official map drawing **69-12** approved by the Kansas state board of health: *Provided, That no land located within the corporate limits of the city located within the boundaries,*

*or any land subject to a county sanitary code which contains provisions for the control of sewage disposal, water supplies and refuse handling practices and is adopted under the provisions of K.S.A. 19-3701 through 19-3708 shall be considered to be a park of the sanitation zone or subject to any sanitation zone or subject to any sanitation zone regulations. (Authorized by K.S.A. 1969 Supp. 65-187; effective E-68-23, Aug. 9, 1968; effective Jan. 1, 1969; amended Jan. 1, 1970.)*

## **TORONTO RESERVOIR SANITATION ZONE**

Boundaries of Toronto reservoir sanitation zone. (Official map filed revisor of statutes, Topeka, and register of deeds in affected counties.) The boundaries of the Toronto reservoir sanitation zone are hereby set and established as shown on the official map drawing **69-13** approved by the Kansas state board of health: *Provided*, That no land located within the corporate limits of the city located within the boundaries, *or any land subject to a county sanitary code which contains provisions for the control of sewage disposal, water supplies and refuse handling practices and is adopted under the provisions of K.S.A. 19-3701 through 19-3708 shall be considered to be a park of the sanitation zone or subject to any sanitation zone or subject to any sanitation zone regulations. (Authorized by K.S.A. 1969 Supp. 65-187; effective E-68-23, Aug. 9, 1968; effective Jan. 1, 1969; amended Jan. 1, 1970.)*

## **TUTTLE CREEK RESERVOIR SANITATION ZONE**

Boundaries of Tuttle Creek reservoir sanitation zone. (Official map filed revisor of statutes, Topeka, and register of deeds in affected counties.) The boundaries of the Tuttle Creek reservoir sanitation zone are hereby set and established as shown on the official map drawing **69-14** approved by the Kansas state board of health: *Provided*, That no land located within the corporate limits of the city located within the boundaries, *or any land subject to a county sanitary code which contains provisions for the control of sewage disposal, water supplies and refuse handling practices and is adopted under the provisions of K.S.A. 19-3701 through 19-3708 shall be considered to be a park of the sanitation zone or subject to any sanitation zone or subject to any sanitation zone regulations. (Authorized by K.S.A. 1969 Supp. 65-187; effective E-68-23, Aug. 9, 1968; effective Jan. 1, 1969; amended Jan. 1, 1970.)*

## **WEBSTER RESERVOIR SANITATION ZONE**

Boundaries of Webster reservoir sanitation zone. (Official map filed revisor of statutes, Topeka, and register of deeds in affected counties.) The boundaries of the Webster reservoir sanitation zone are hereby set and established as shown on the official map drawing **69-15** approved by the Kansas state board of health: *Provided*, That no land located within the corporate limits of the city located within the boundaries, *or any land subject to a county sanitary code which contains provisions for the control of sewage disposal, water supplies and refuse handling practices and is adopted under the provisions of K.S.A. 19-3701 through 19-3708 shall be considered to be a park of the sanitation zone or subject to any sanitation zone or subject to any sanitation zone regulations. (Authorized by K.S.A. 1969 Supp. 65-187; effective E-68-23, Aug. 9, 1968; effective Jan. 1, 1969; amended Jan. 1, 1970.)*

## **WILSON RESERVOIR SANITATION ZONE**

Boundaries of Wilson reservoir sanitation zone. (Official map filed revisor of statutes, Topeka, and register of deeds in affected counties.) The boundaries of the Wilson reservoir sanitation zone are hereby set and established as shown on the official map drawing **69-16** approved by the Kansas state board of health: *Provided, That no land located within the corporate limits of the city located within the boundaries, or any land subject to a county sanitary code which contains provisions for the control of sewage disposal, water supplies and refuse handling practices and is adopted under the provisions of K.S.A. 19-3701 through 19-3708 shall be considered to be a park of the sanitation zone or subject to any sanitation zone or subject to any sanitation zone regulations.* (Authorized by K.S.A. 1969 Supp. 65-187; effective E-68-23, Aug. 9, 1968; effective Jan. 1, 1969; amended Jan. 1, 1970.)

## **EL DORADO RESERVOIR SANITATION ZONE**

Boundaries of El Dorado reservoir sanitation zone. (Official map filed revisor of statutes, Topeka, and register of deeds in affected counties.) The boundaries of the El Dorado reservoir sanitation zone are hereby set and established as shown on the official map drawing **69-23** approved by the Kansas state board of health: *Provided, That no land located within the corporate limits of the city located within the boundaries, or any land subject to a county sanitary code which contains provisions for the control of sewage disposal, water supplies and refuse handling practices and is adopted under the provisions of K.S.A. 19-3701 through 19-3708 shall be considered to be a park of the sanitation zone or subject to any sanitation zone or subject to any sanitation zone regulations.* (Authorized by K.S.A. 1969 Supp. 65-187; effective E-68-23, Aug. 9, 1968; effective Jan. 1, 1969; amended Jan. 1, 1970.)

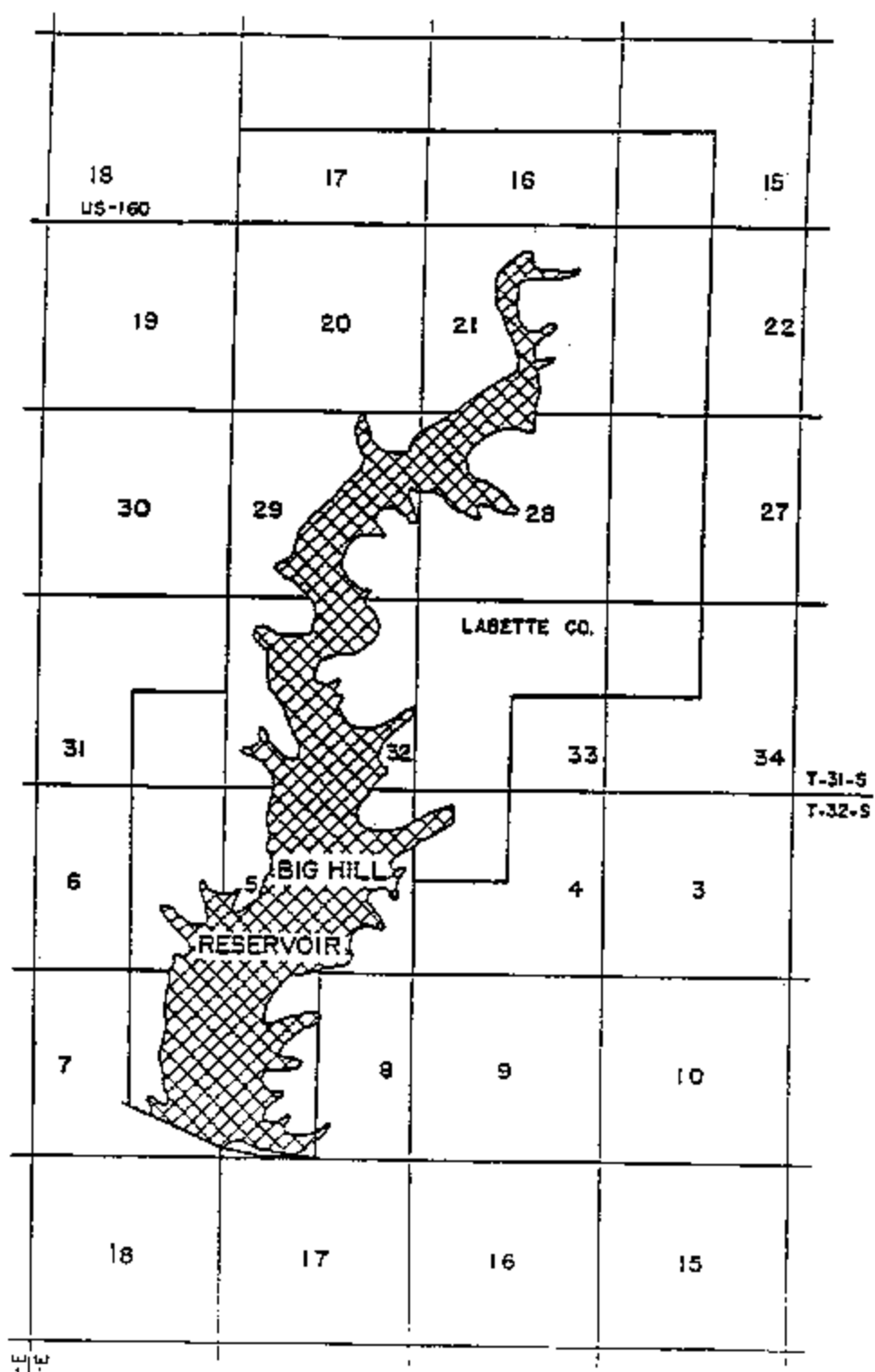
## **BIG HILL RESERVOIR SANITATION ZONE**

Boundaries of Big Hill reservoir sanitation zone. (Official map filed revisor of statutes, Topeka, and register of deeds in affected counties.) The boundaries of the Big Hill reservoir sanitation zone are hereby set and established as shown on the official map drawing **72-25** approved by the Kansas state board of health: *Provided, That no land located within the corporate limits of the city located within the boundaries, or any land subject to a county sanitary code which contains provisions for the control of sewage disposal, water supplies and refuse handling practices and is adopted under the provisions of K.S.A. 19-3701 through 19-3708 shall be considered to be a park of the sanitation zone or subject to any sanitation zone or subject to any sanitation zone regulations.* (Authorized by K.S.A. 1972 Supp. 65-187; effective E-68-23, Jan. 1, 1973.)

## **HILLSIDE RESERVOIR SANITATION ZONE**

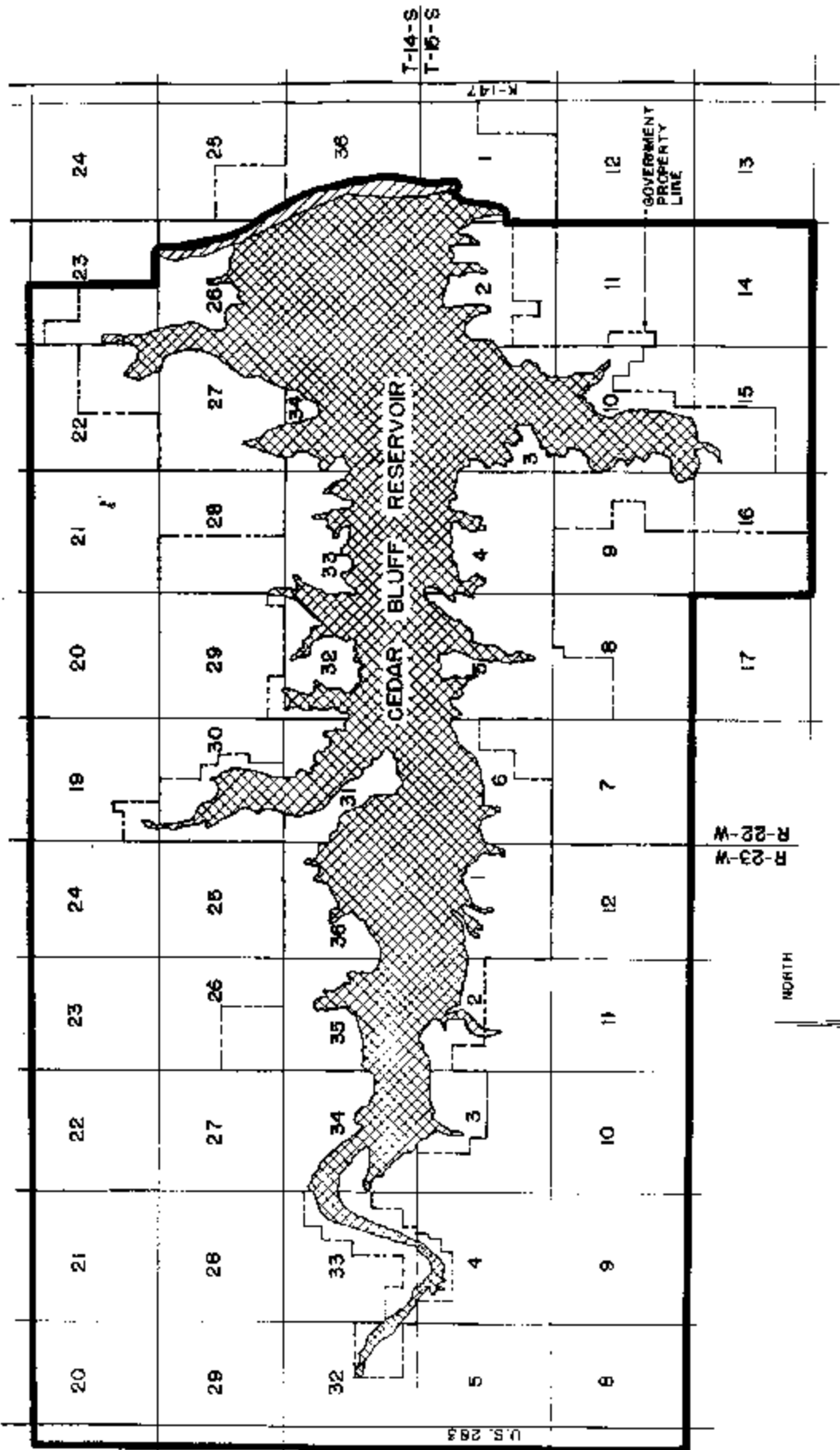
Boundaries of Hillside reservoir sanitation zone. (Official map filed revisor of statutes, Topeka, and register of deeds in affected counties.) The boundaries of the Hillside reservoir sanitation zone are hereby set and established as shown on the official map drawing **72-24** approved by the Kansas state board of health: *Provided, That no land located within the corporate limits of the city located within the boundaries, or any*

*land subject to a county sanitary code which contains provisions for the control of sewage disposal, water supplies and refuse handling practices and is adopted under the provisions of K.S.A. 19-3701 through 19-3708 shall be considered to be a park of the sanitation zone or subject to any sanitation zone or subject to any sanitation zone regulations. (Authorized by K.S.A. 1972 Supp. 65-187; effective E-68-23, Jan. 1, 1973.)*



28-10-38

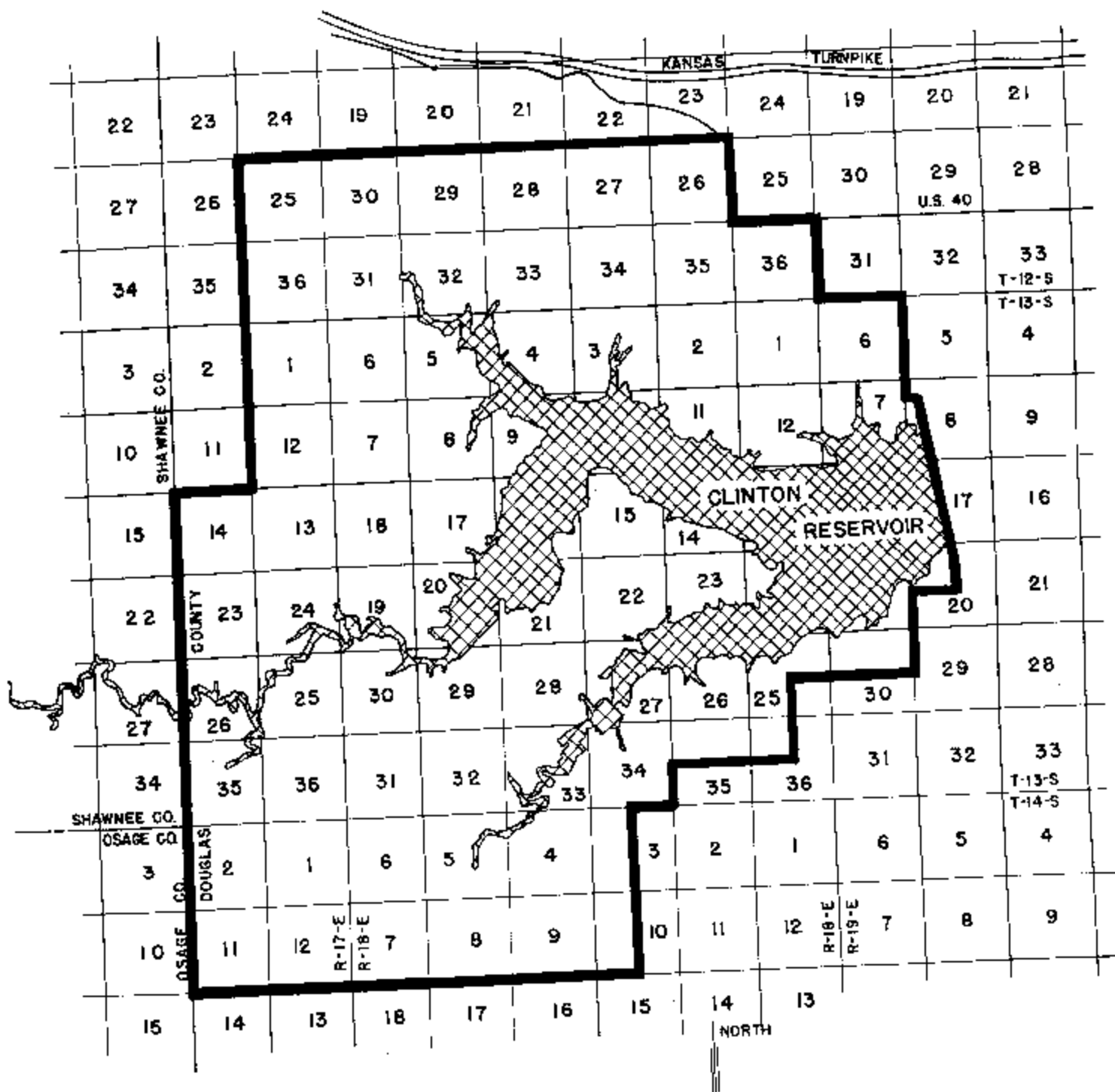
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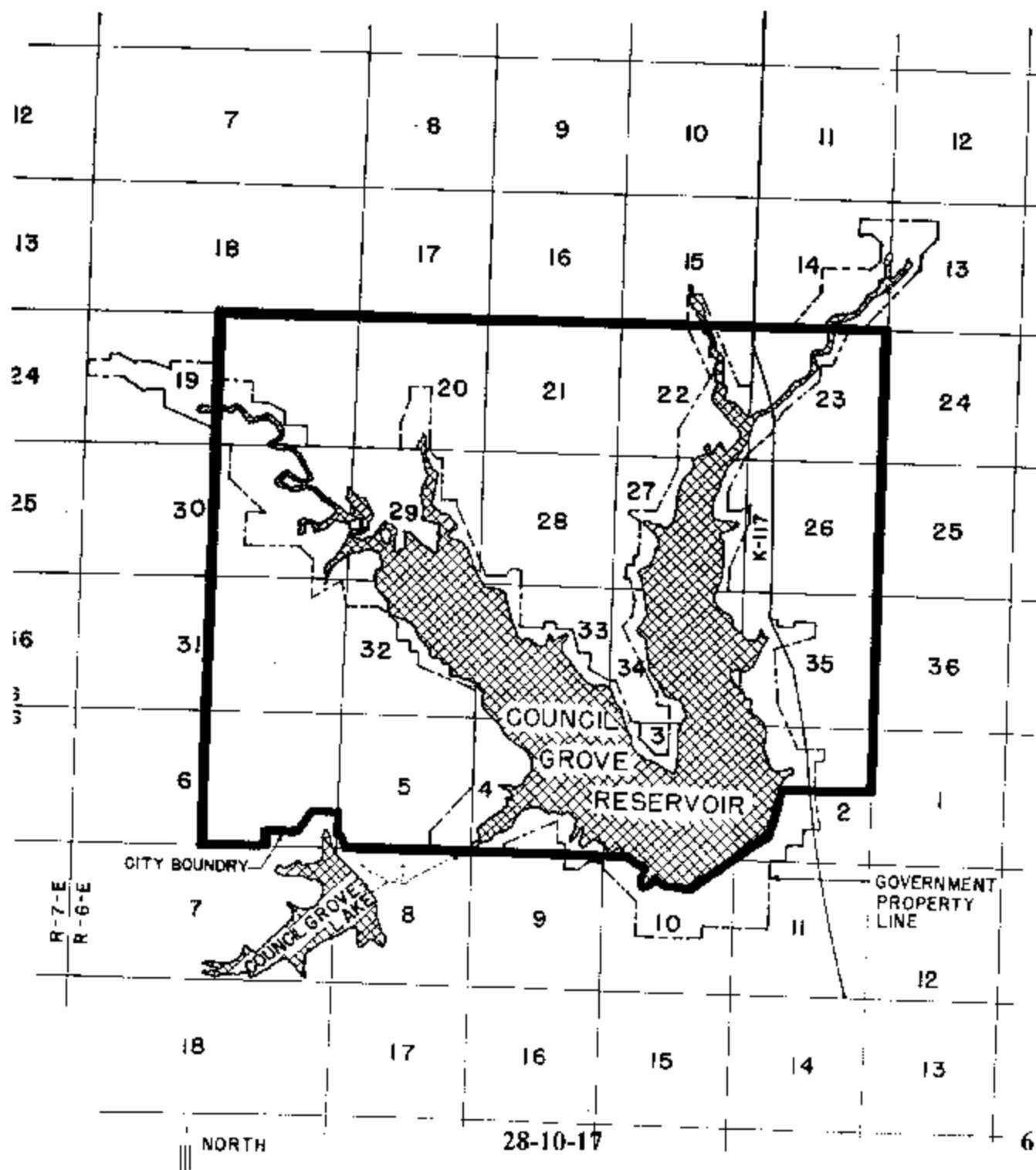
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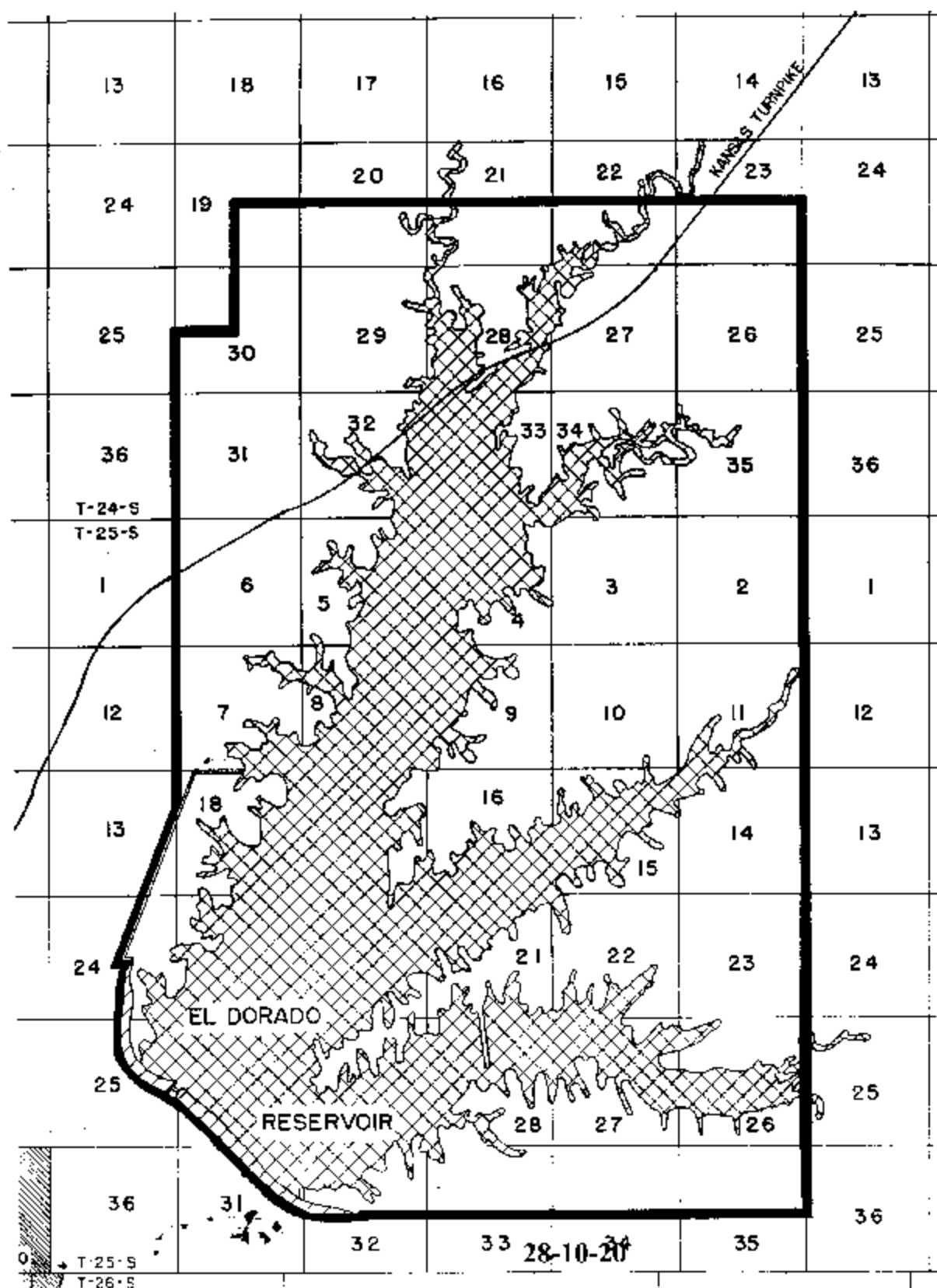
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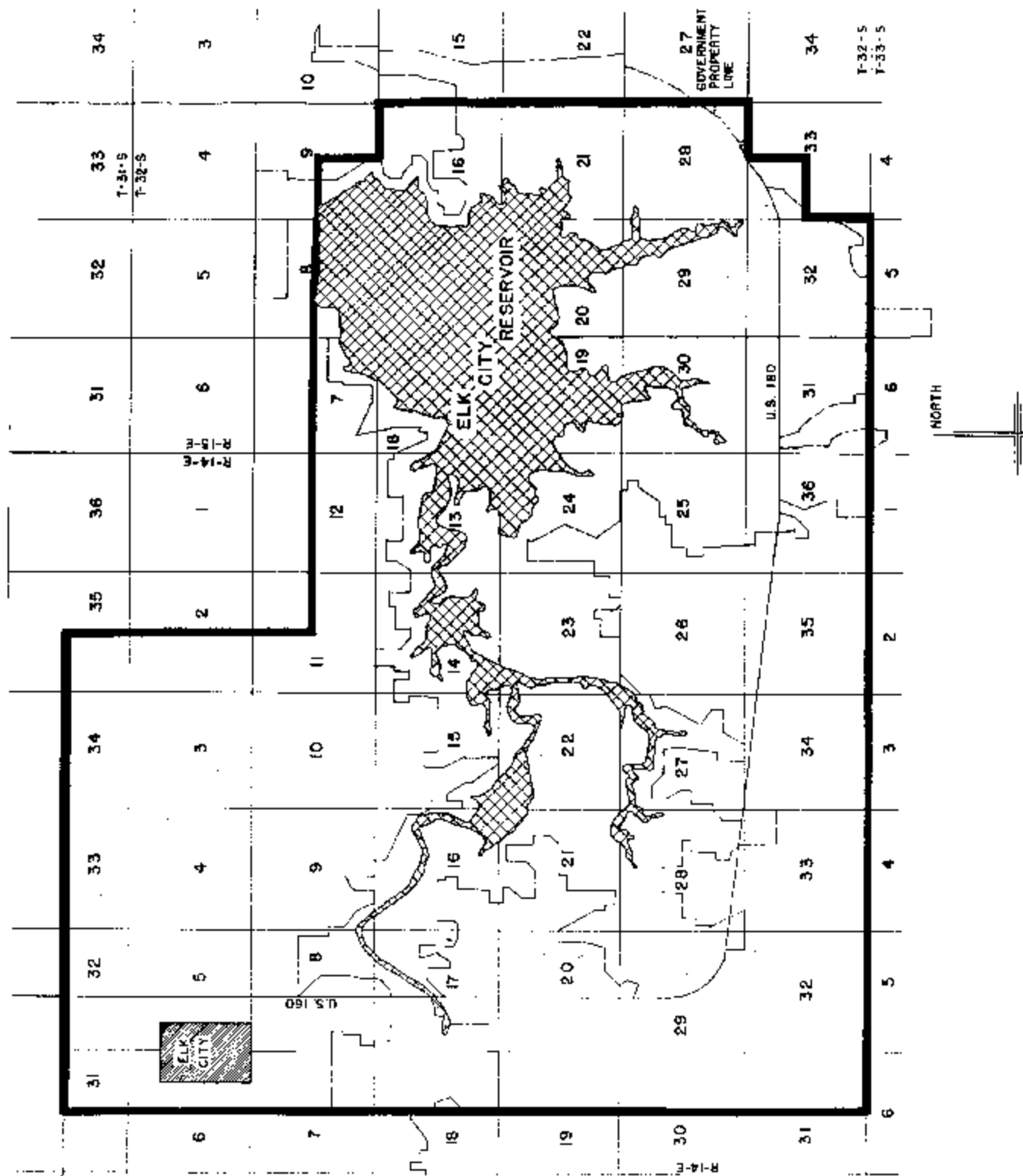




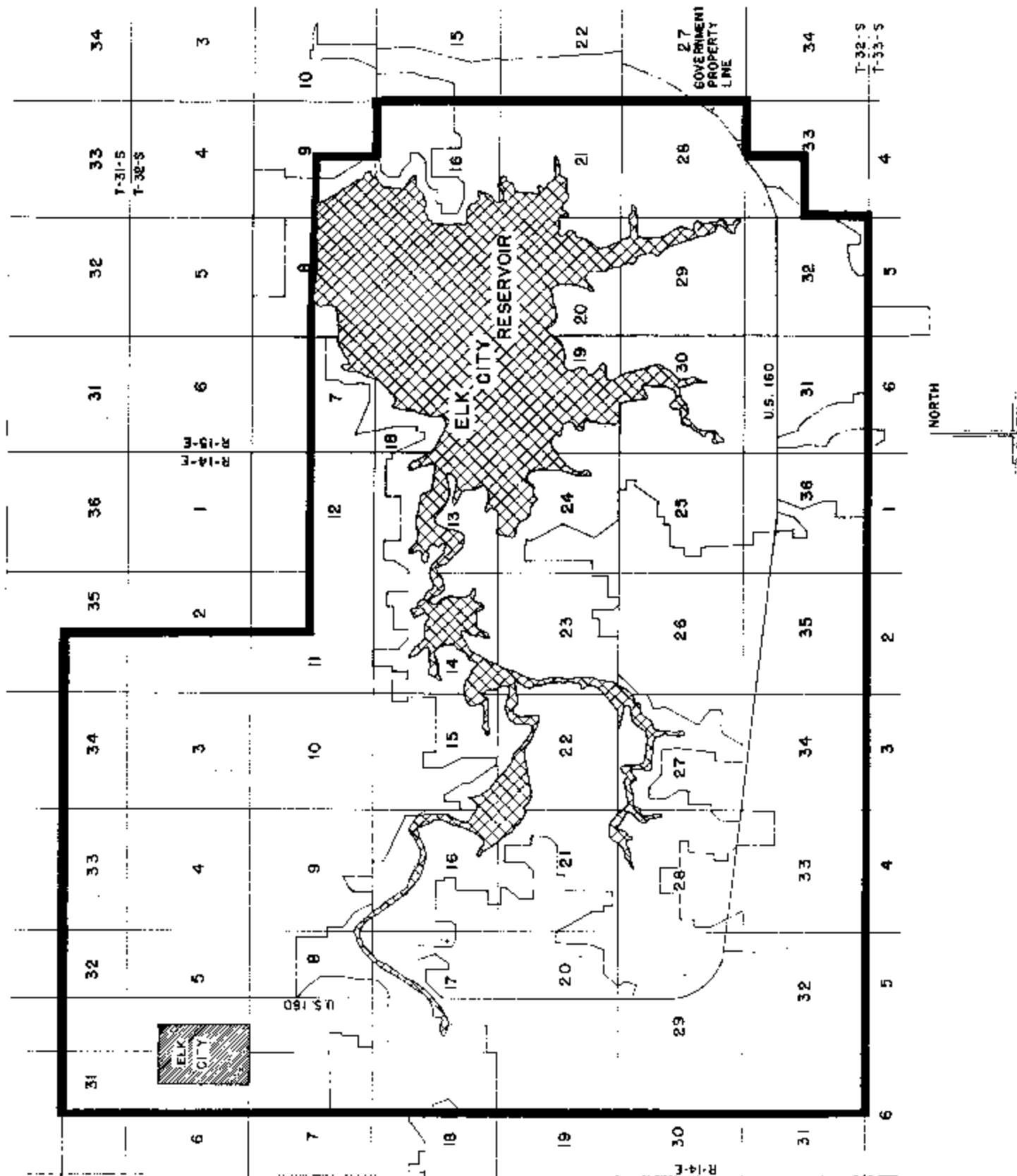
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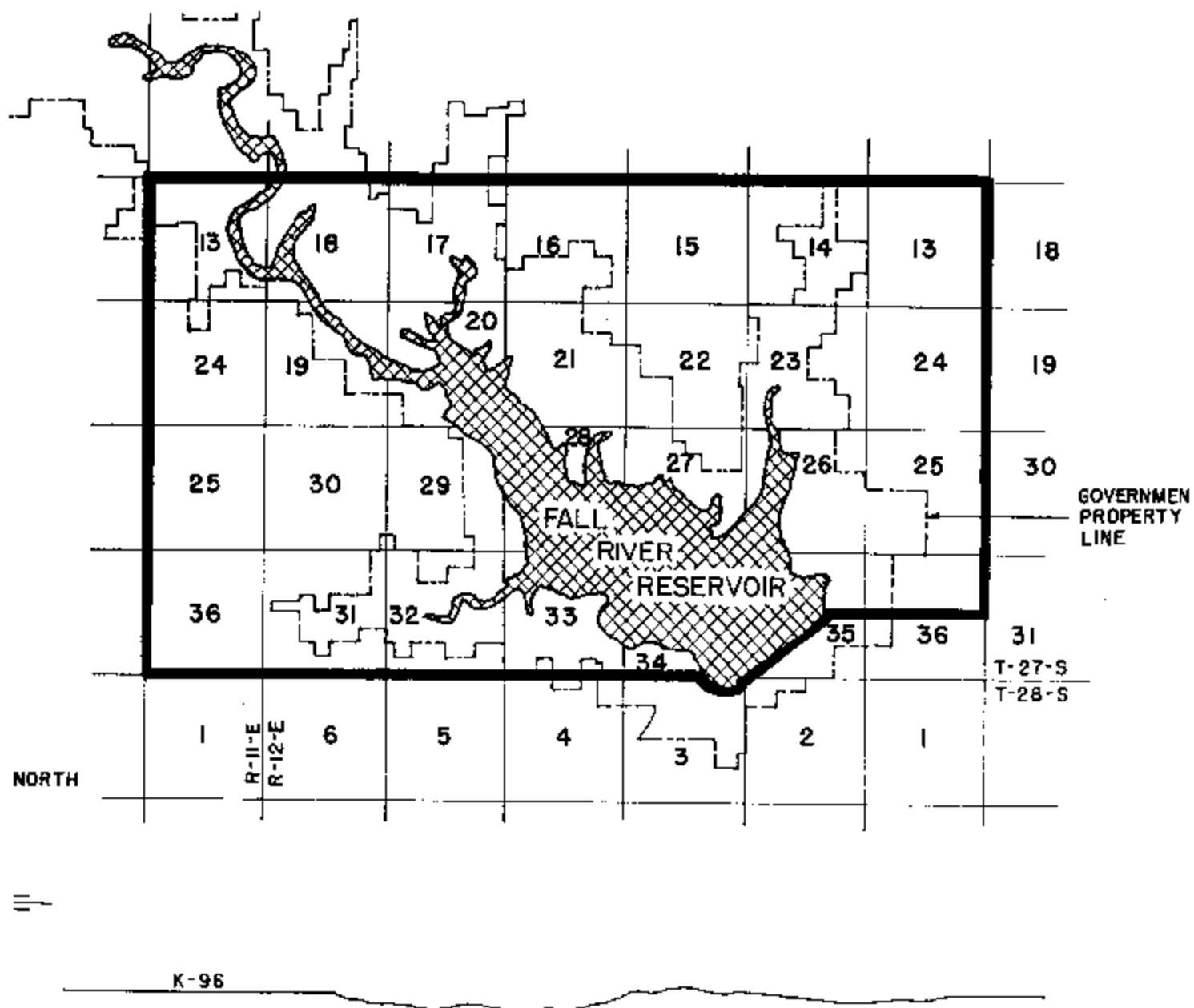




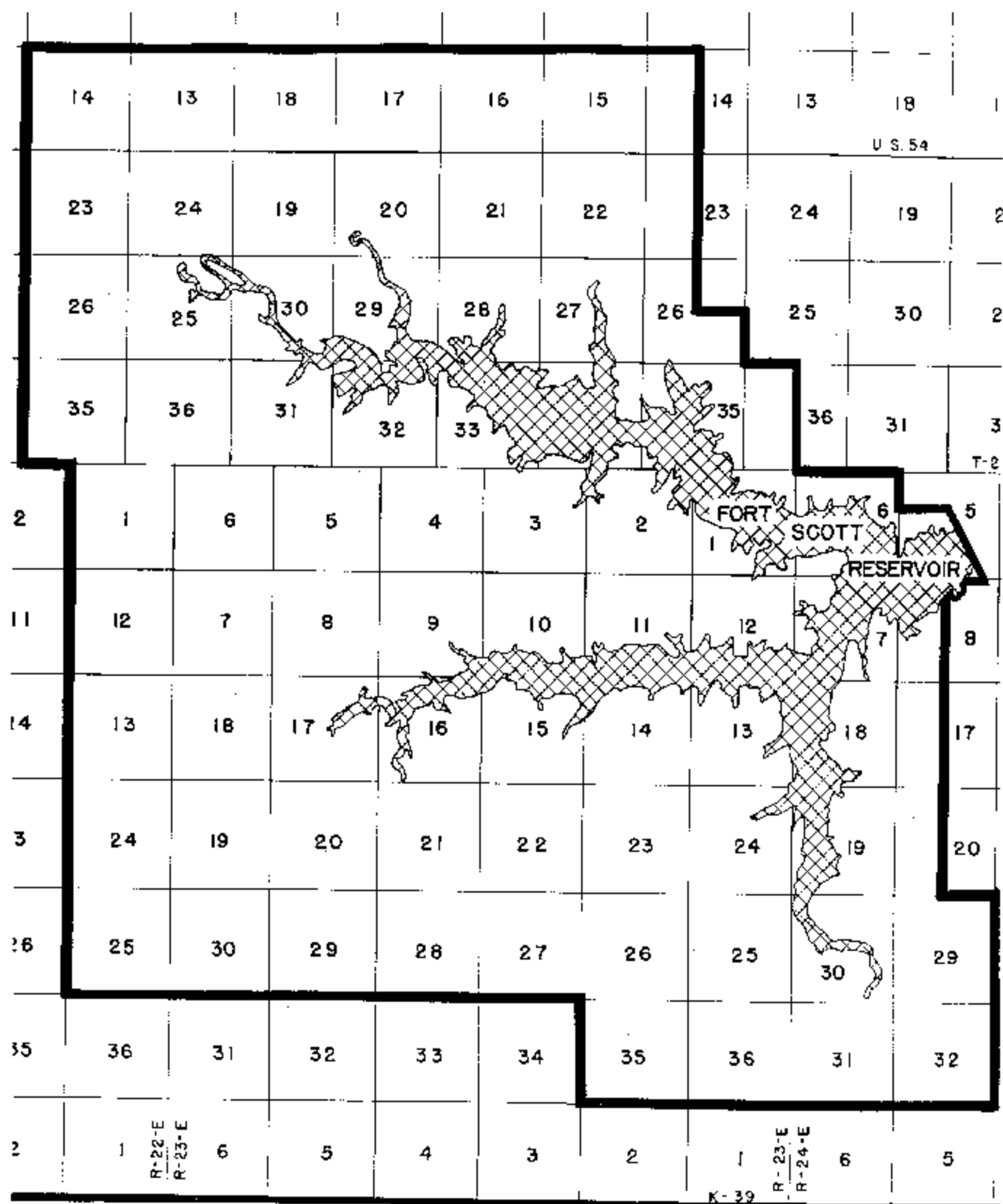


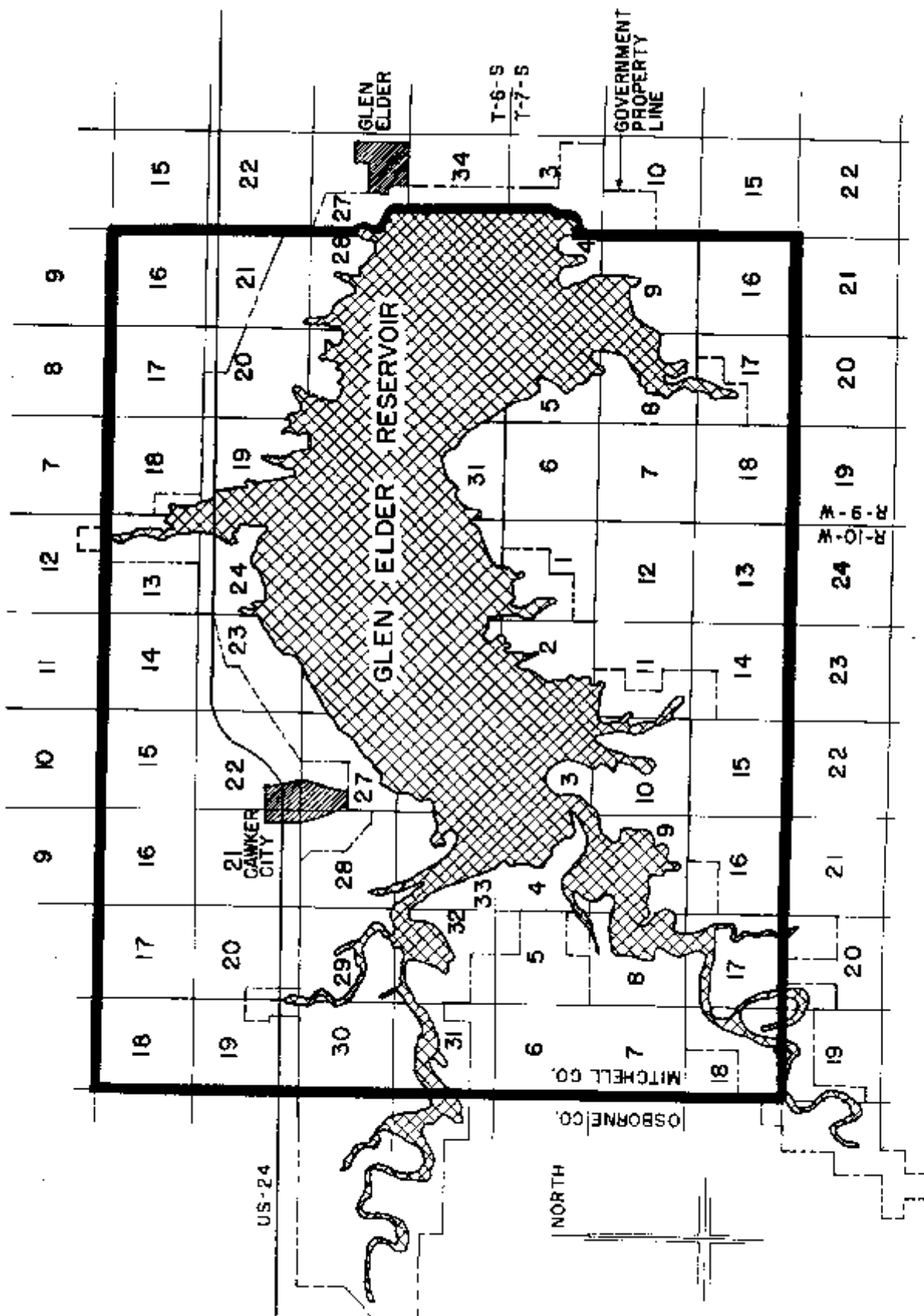
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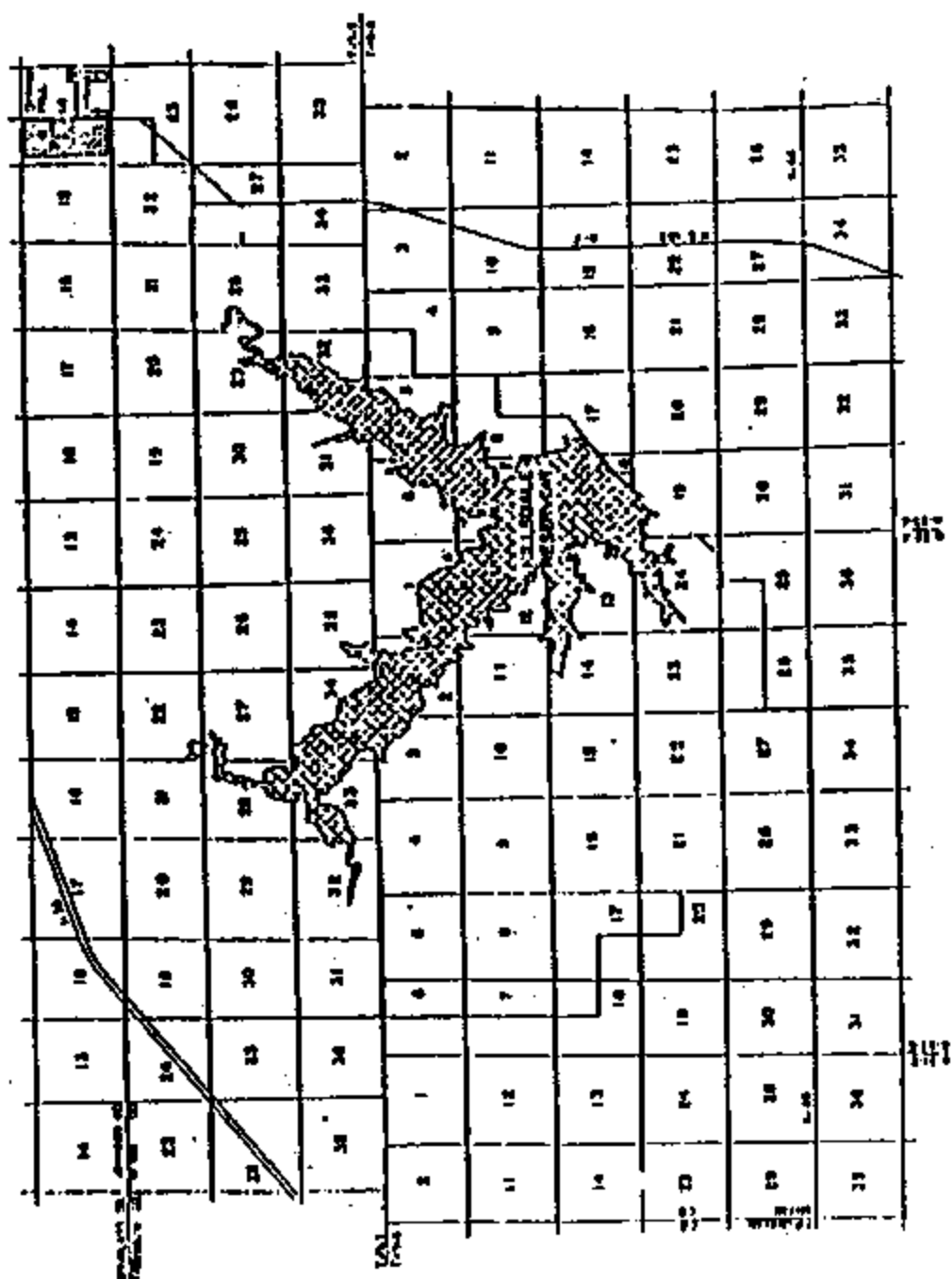




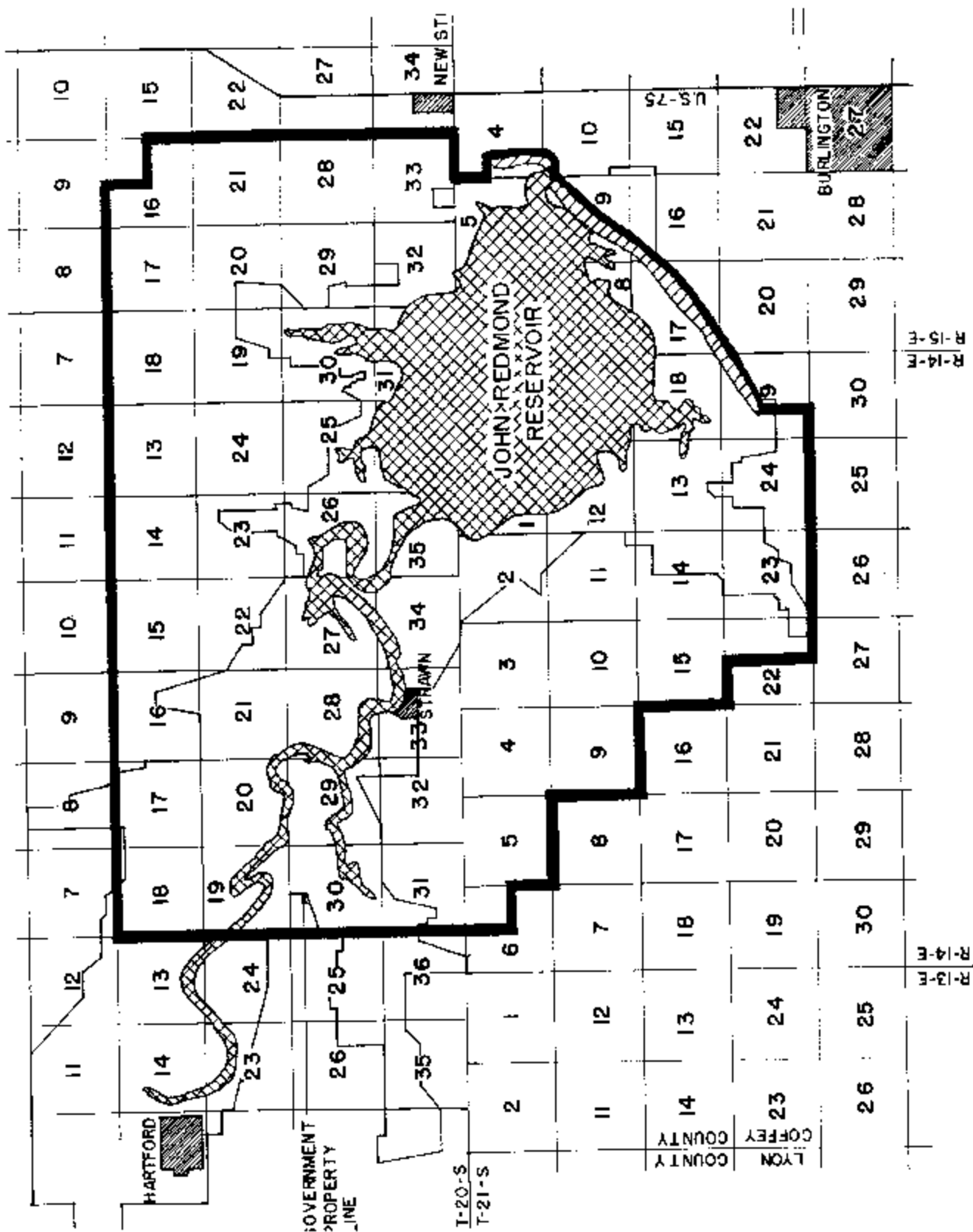
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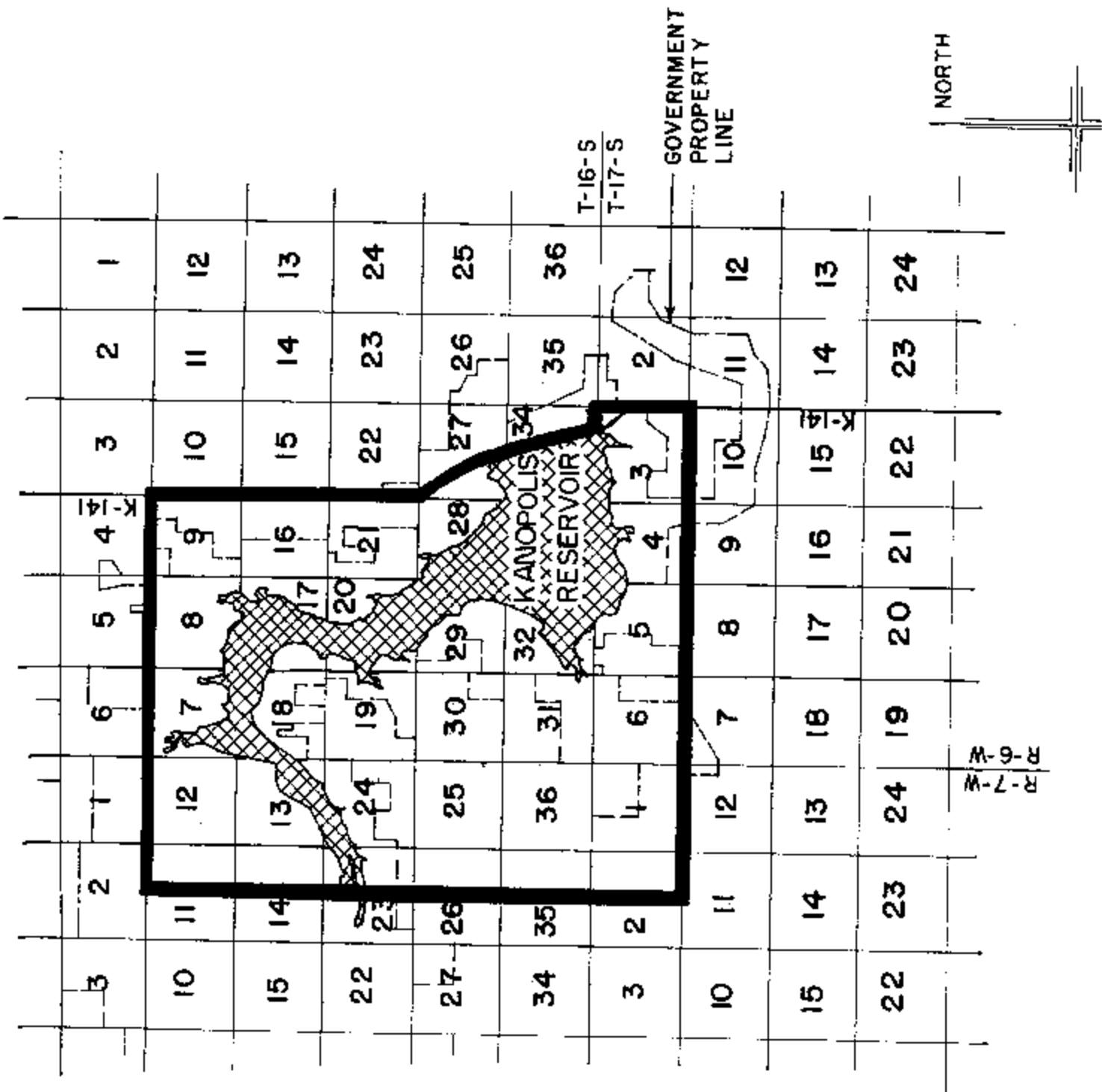




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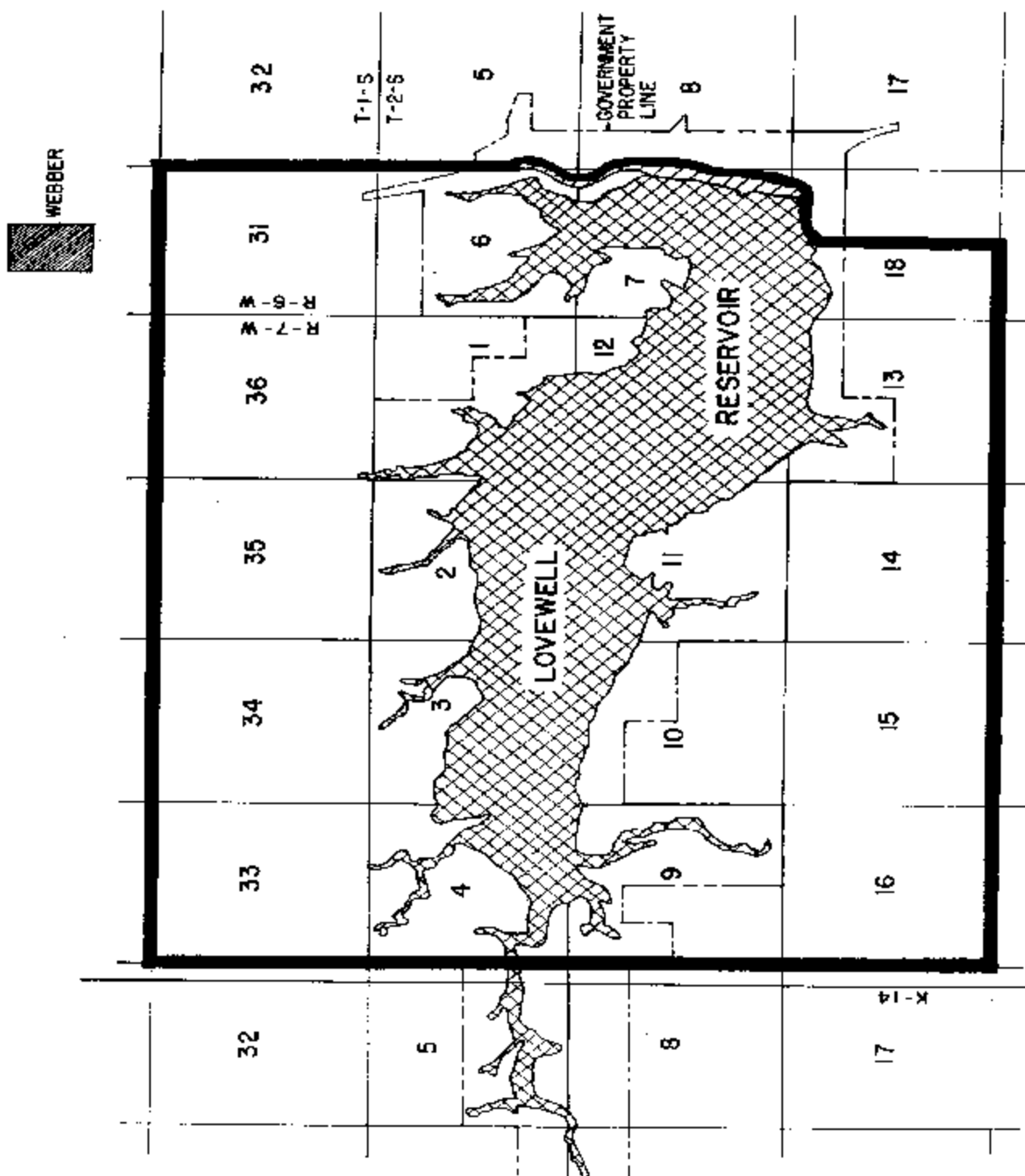


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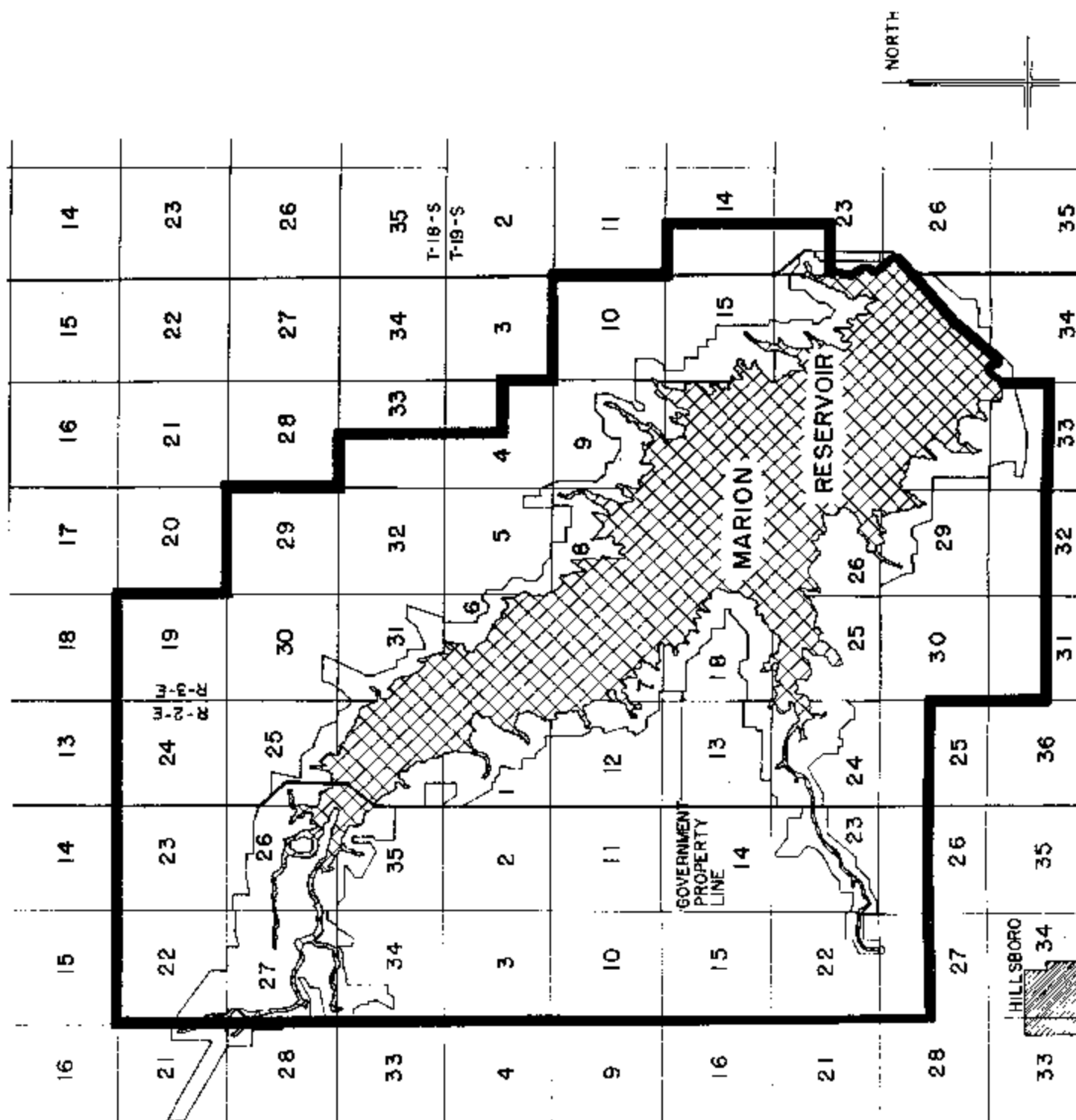


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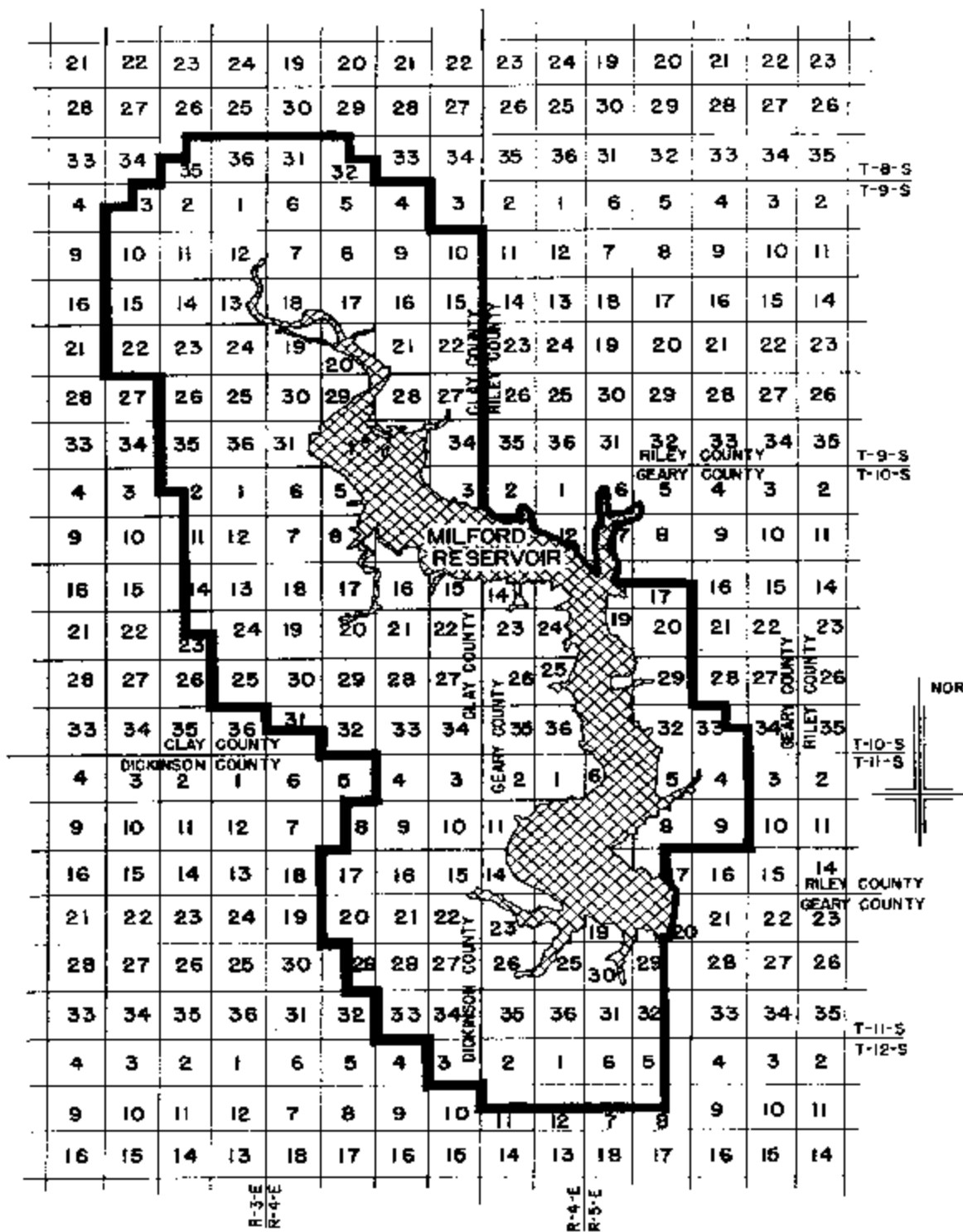
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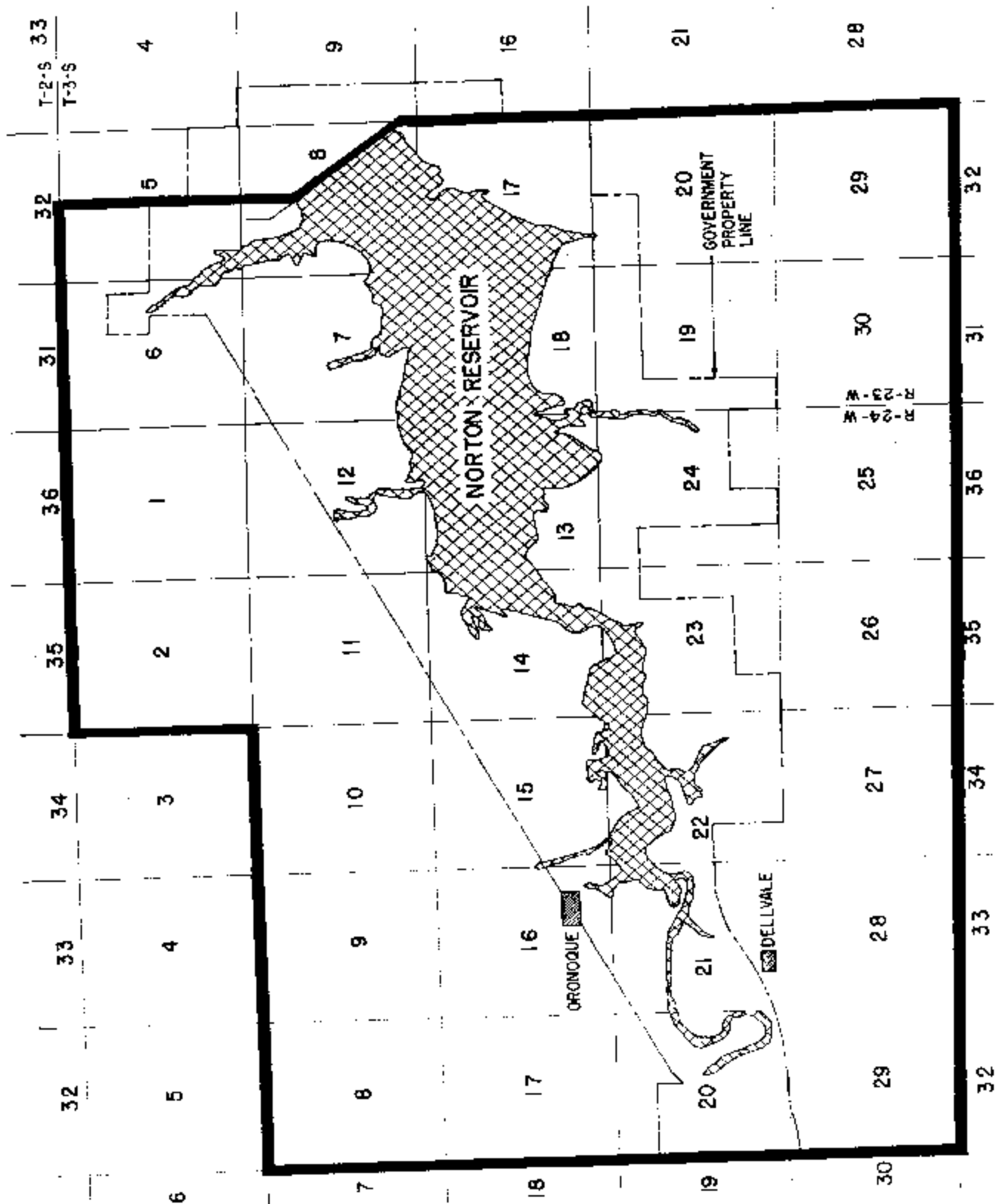
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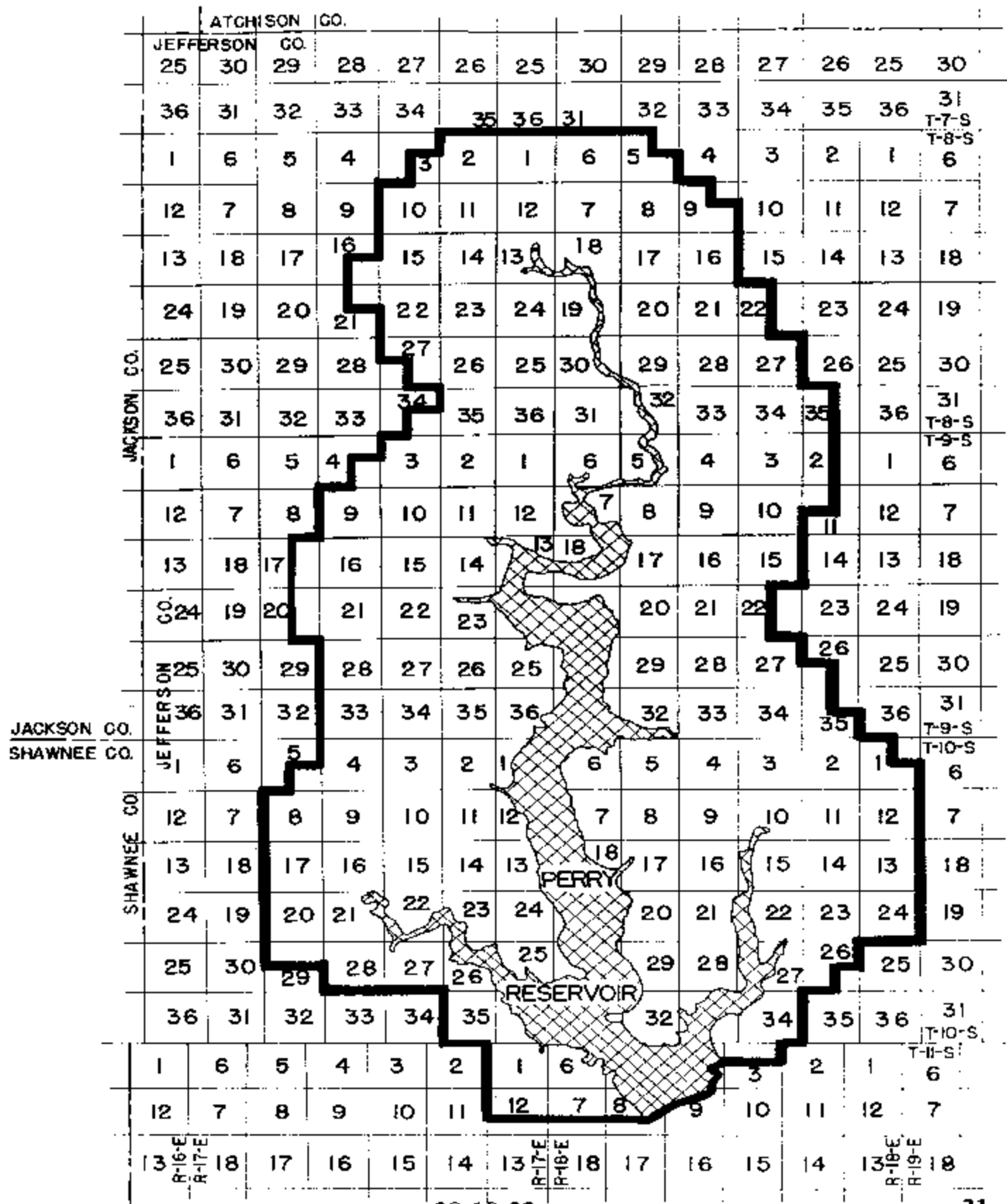


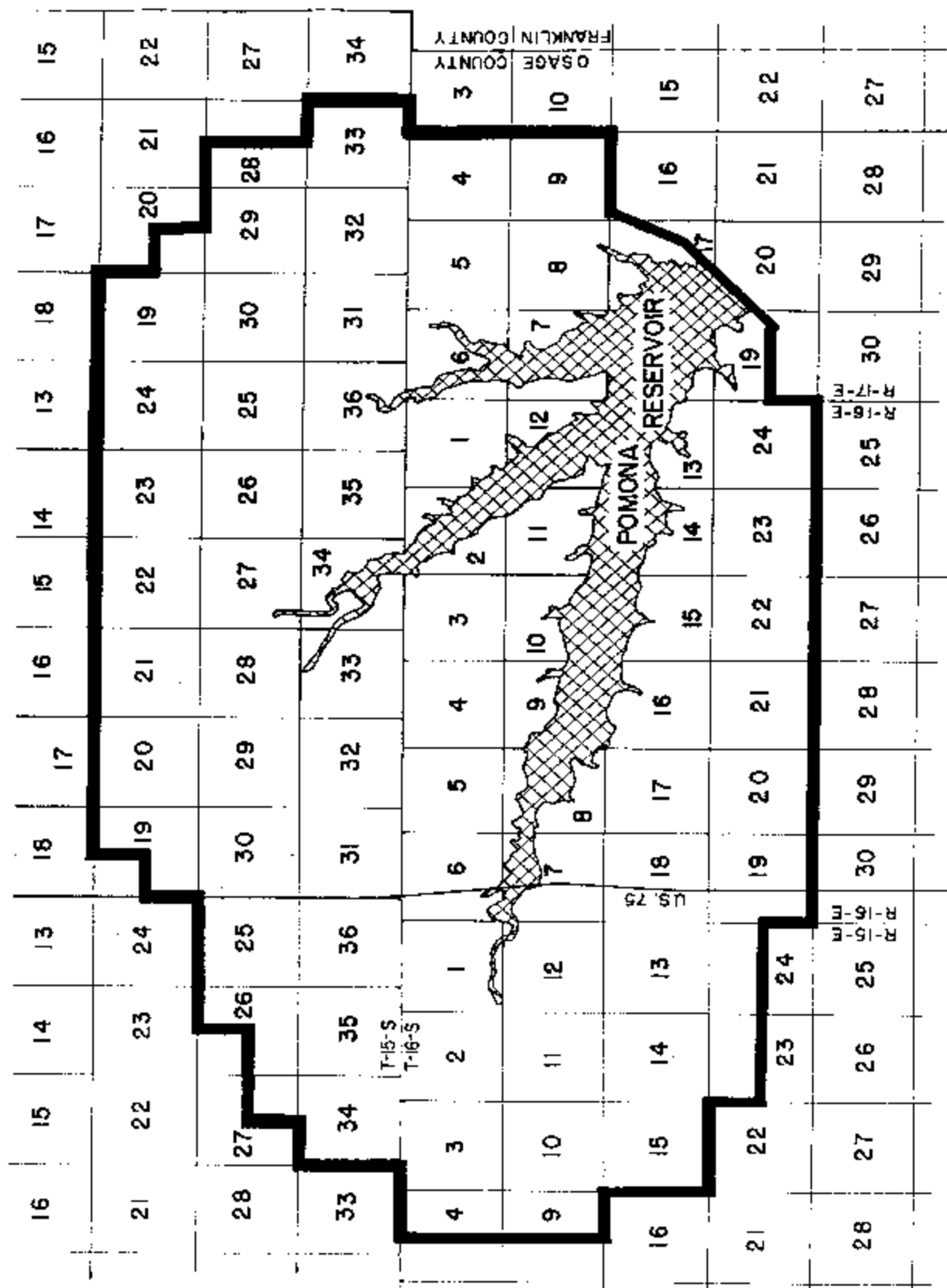
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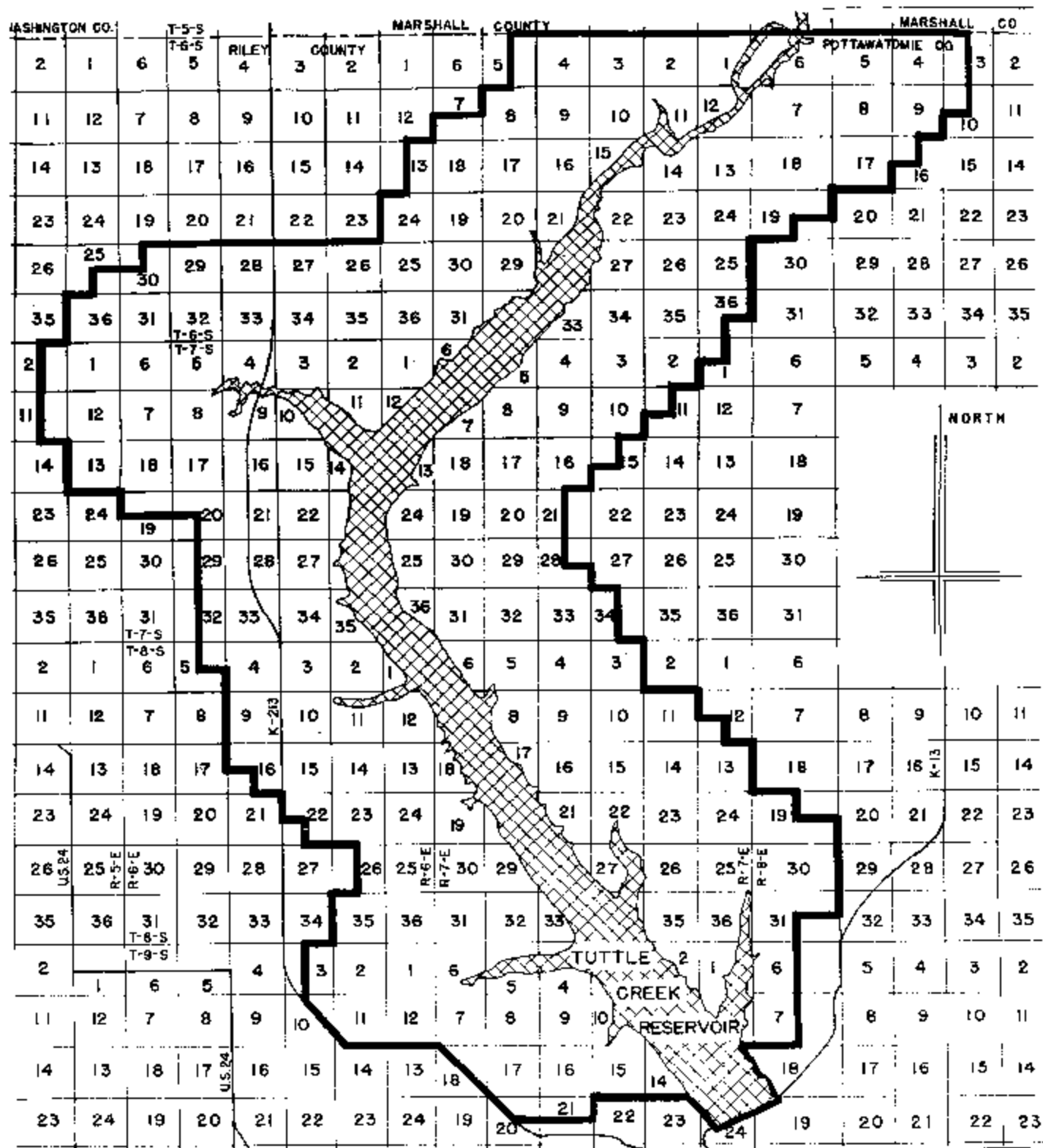
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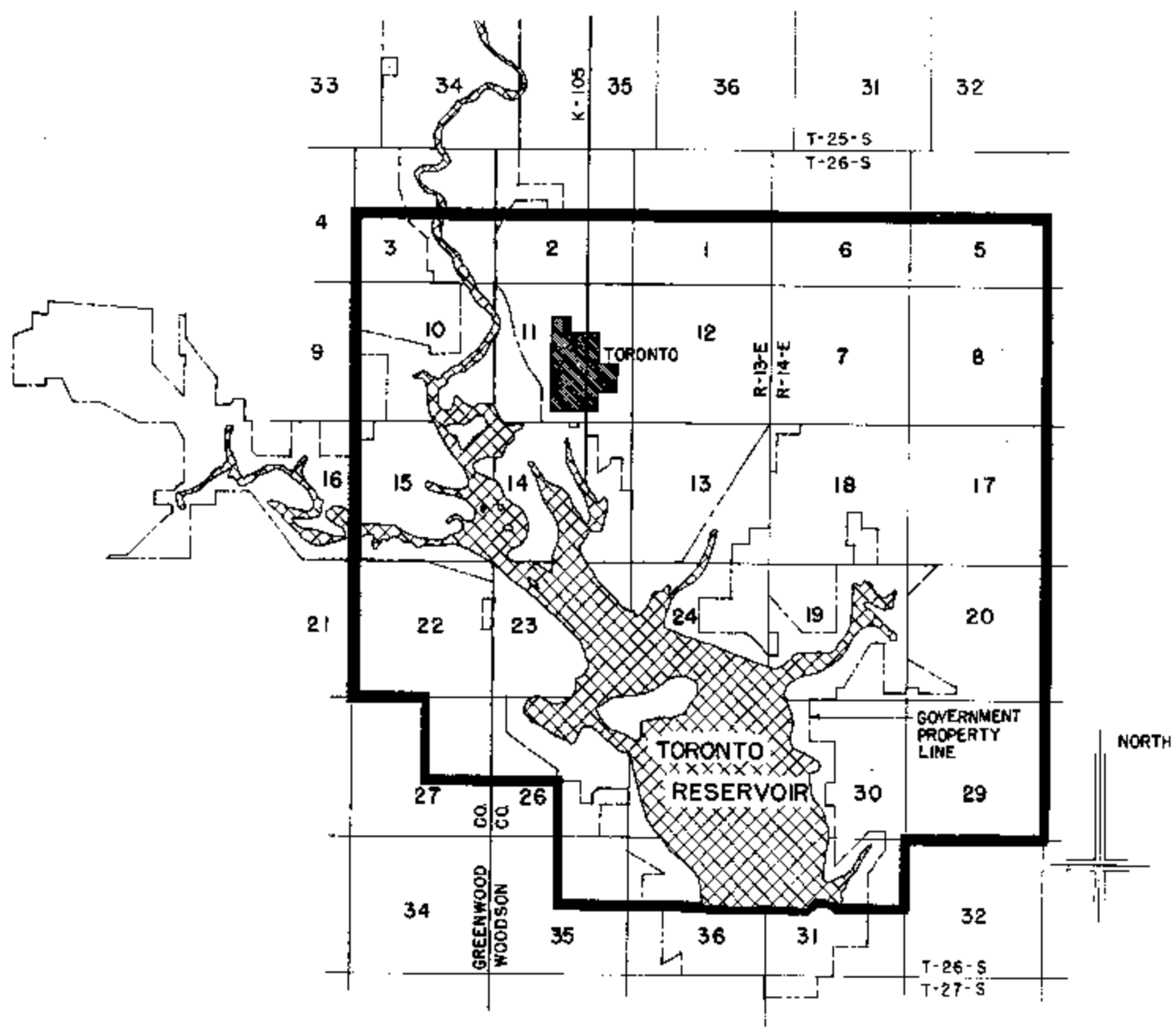
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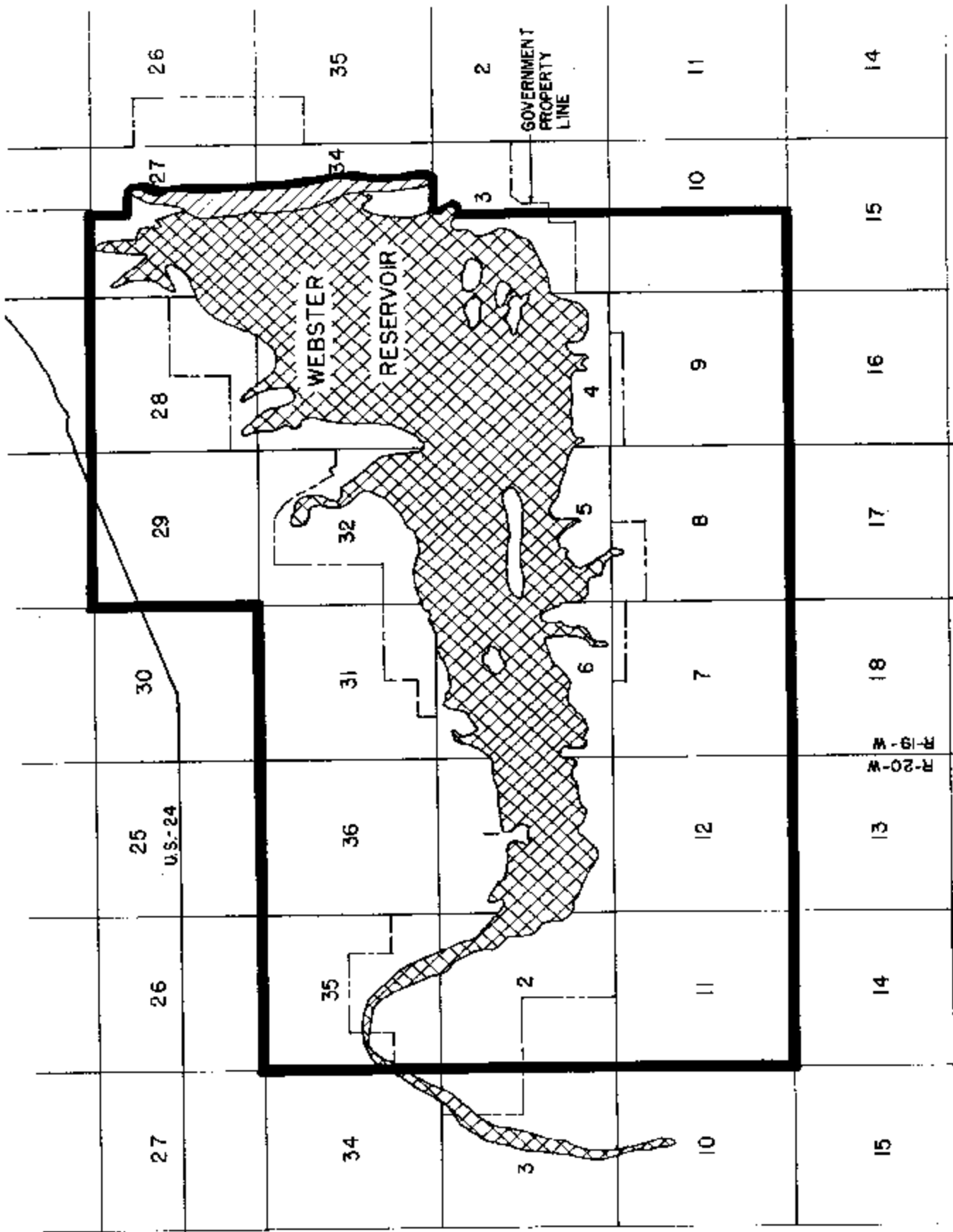


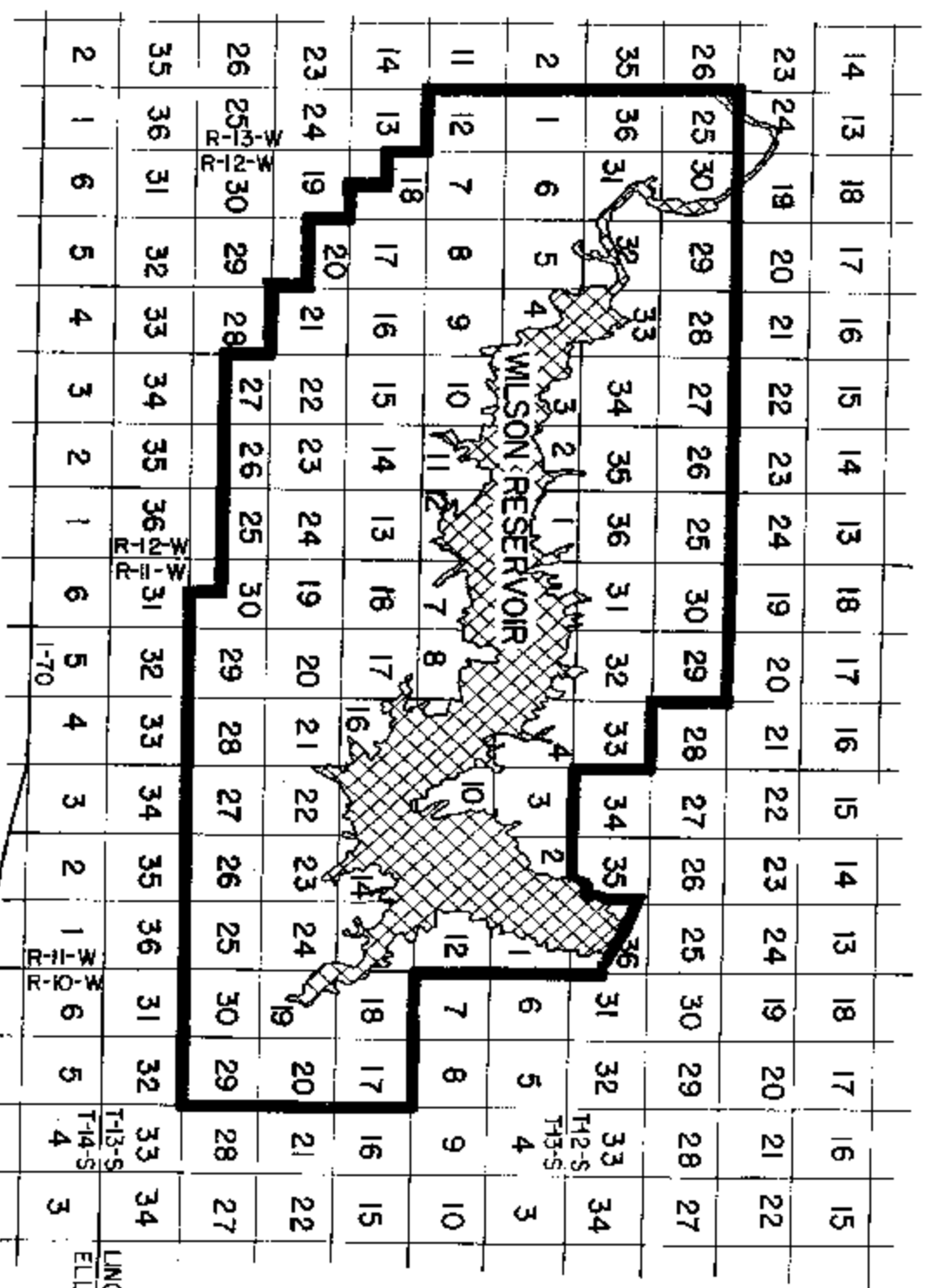


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# KANSAS DEPARTMENT OF AGRICULTURE

Office of the Secretary (785) 296-3556

Bill Graves, Governor

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Jamie Clover Adams,  
Secretary

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## KANSAS WATER APPROPRIATION ACT

K.S.A. 82a-701. Definitions. When used in this act, unless the context indicates otherwise, the following words shall have the following meanings:

(a) "Person" shall mean and include a natural person, a partnership, an organization, a corporation, a municipality and any agency of the state or federal government.

(b) "Chief engineer" means the chief engineer of the division of water resources of the Kansas state board of agriculture.

(c) "Domestic uses" means the use of water by any person or by a family unit or household for household purposes, or for the watering of livestock, poultry, farm and domestic animals used in operating a farm, and for the irrigation of lands not exceeding a total of two (2) acres in area for the growing of gardens, orchards and lawns.

(d) "Vested right" means the right of a person under a common law or statutory claim to continue the use of water having actually been applied to any beneficial use, including domestic use, on or before June 28, 1945, to the extent of the maximum quantity and rate of diversion for the beneficial use made thereof, and shall include the right to take and use water for beneficial purposes where a person is engaged in the construction of works for the actual application of water to a beneficial use on June 28, 1945, provided such works shall be completed and water is actually applied for such use within a reasonable time thereafter by such person, his heirs, successors or assigns. Such a right does not include, however, those common law claims under which a person has not applied water to any beneficial use within the periods of time set out in this subsection.

(e) "Appropriator" means and includes a person who has an appropriation right that has been perfected in conformity with article 7 of chapter 82a of the Kansas Statutes Annotated and acts amendatory thereof and supplemental thereto.

(f) "Appropriation right" is a right, acquired under the provisions of article 7 of chapter 82a of the Kansas Statutes Annotated and acts amendatory thereof and supplemental thereto, to divert from a definite water supply a specific quantity of water at a specific rate of diversion, provided such water is available in excess of the requirements of all vested rights that relate to such supply and all appropriation rights of earlier date that relate to such supply, and to apply such water to a specific beneficial use or uses in preference to all appropriations right of later date.

(g) "Water right" means any vested right or appropriation right under which a person may lawfully divert and use water. It is a real property right appurtenant to and severable from the land on or in connection with which the water is used and such water right passes as an appurtenance with a

conveyance of the land by deed, lease, mortgage, will, or other voluntary disposal, or by inheritance. (History: L. 1945; amended 1957; amended 1977; amended 1978.)

K.S.A. 82a-702. Dedication of use of water. All water within the state of Kansas is hereby dedicated to the use of the people of the state, subject to the control and regulation of the state in the manner herein prescribed. (History: L. 1945.)

K.S.A. 82a-703. Water may be appropriated subject to vested rights. Except as provided in K.S.A. 82a-703a and subject to vested rights, all waters within the state may be appropriated for beneficial use as herein provided. Nothing contained in this act shall impair the vested right of any person except for nonuse. (History: L. 1945; amended 1980.)

K.S.A. 82a-703a. Minimum streamflows; duties of chief engineer. Whenever the legislature enacts legislation establishing a minimum desirable streamflow for any watercourse in this state, the chief engineer shall withhold from appropriation that amount of water deemed necessary to establish and maintain for the identified watercourse the desired minimum streamflow. (History: L. 1980; amended 1984; amended 1985.)

K.S.A. 82a-703b. Minimum streamflows; condition of appropriation right. (a) In addition to any other limitation or condition prescribed by law or rule and regulation of the chief engineer, it shall be an express condition of each and every appropriation right, except for use of water for domestic purposes, applied for after April 12, 1984, that such right shall be subject to any minimum desirable streamflow requirements identified and established pursuant to law on or before July 1, 1990, for the source of water supply to which such right applies.

(b) All vested rights, water appropriation rights and applications for permits to appropriate water having a priority date on or before April 12, 1984, shall not be subject to any minimum desirable streamflow requirements established pursuant to law. (History: L. 1984; amended 1987.)

K.S.A. 82a-703c. Minimum streamflows established. In accordance with the provisions of K.S.A. 82a-703a, and amendments thereto, the legislature hereby establishes the following minimum desirable streamflows:

Table--Minimum Desirable Streamflows (cfs)

Watercourse	J	F	M	A (a)	M (a)	J (a)	J	A	S	O	N	D
Marais des Cygnes - Ottawa	15	15	15	15 (40)	20 (50)	25 (50)	25	25	20	15	15	15
Marais des Cygnes - LaCygne	20	20	20	20 (50)	20 (150)	25 (150)	25	25	20	20	20	20
Neosho - Americus	5	5	5	5 (20)	5 (30)	5 (30)	5	5	5	5	5	5
Neosho - Iola	40	40	40	40 (60)	40 (200)	40 (200)	40	40	40	40	40	40

persons claiming a vested right for the beneficial use of water, other than for domestic use, which has not been determined pursuant to K.S.A. 82a-704, shall file by July 1, 1980, with the chief engineer a verified claim for such vested right. The chief engineer shall not accept any such claim after said date. Such verified claim shall be upon forms provided therefor by the chief engineer and shall set forth:

- (1) The name and post-office address of the claimant;
- (2) the source to which the claim relates;
- (3) the amount of water claimed;
- (4) the location of the works for the diversion and use of the claimed water;
- (5) the dates of the beneficial use made; and
- (6) any additional information the chief engineer may require.

(b) Upon receipt of a verified claim for a vested right for the beneficial use of water, the chief engineer shall investigate the same and shall conduct a hearing thereon. Such hearing shall be noticed by restricted mail to the claimant and to other known interested persons within a five (5) mile radius of the point of diversion of such claimed vested right at least thirty (30) days prior to the date set for the hearing. Notice shall also be given by publication in a newspaper of general circulation in the county wherein the vested right is claimed to exist at least once each week for three (3) consecutive weeks prior to the hearing. Such published notice shall contain the date and place of hearing and a general description of the area affected by the claimed vested right and shall be directed to all persons interested and concerned. At the hearing, the chief engineer shall take evidence of all persons interested and concerned and the same shall be considered in the determination of the existence of a vested right for beneficial use of water. As soon as possible thereafter the chief engineer shall make an order determining the existence or nonexistence of the claimed vested right and shall notify the claimant and contestants thereof as to the contents of such order. Service of such notice shall be deemed complete upon depositing such notice in the post office as restricted mail addressed to the vested right claimant and any contestant thereto whose address is known to the chief engineer, and upon the publication of an abstract of such order once each week for three (3) consecutive weeks in a newspaper of general circulation in the county wherein the vested right is claimed to exist.

(c) Any claimant of a vested right or person contesting the same who considers himself or herself aggrieved by the order of determination of a vested right may appeal to the district court in the manner prescribed by K.S.A. 82a-724.

(d) The order of determination of a vested right of the chief engineer shall be in full force and effect from the date of its entry in the records of his or her office unless and until its operation shall be stayed by an appeal therefrom by the claimant thereof or a contestant thereto in accordance with the provisions of K.S.A. 82a-724 except that no such determination shall be deemed an adjudication of the relation between any vested right holders with respect to the operation or exercise of their vested rights.

(e) The chief engineer shall file a copy of any order of determination of the existence of a vested right with the register of deeds of the county wherein the land is located to which such vested right is appurtenant. The register of deeds shall record the same as other instruments affecting real estate.

(f) No vested right for the beneficial use of water, other than for domestic use, shall be deemed to exist from and after July 1, 1980, unless the same has been determined to exist pursuant to the provisions of this act or pursuant to the provisions of K.S.A. 82a-704. (History: L. 1978.)

K.S.A. 82a-704b. Same; notice. The chief engineer shall provide notice throughout the state of the provisions of this act by means assuring the widest dissemination thereof as practicable. (History: L. 1978.)

K.S.A. 82a-704c. Same; supplemental to Kansas water appropriation act. The provisions of K.S.A. 82a-704a shall be a part of and supplemental to the Kansas water appropriation act. (History: L. 1978.)

K.S.A. 82a-705. Acquisition of appropriation right to use water other than domestic; approval. No person shall have the power or authority to acquire an appropriation right to the use of water for other than domestic use without first obtaining the approval of the chief engineer, and no water rights of any kind may be acquired hereafter solely by adverse use, adverse possession, or by estoppel. (History: L. 1945; amended 1957.)

K.S.A. 82a-705a. Domestic use after June 28, 1945; information to chief engineer. The use of water for domestic purposes instituted subsequently to June 28, 1945, to the extent that it is beneficial, shall constitute an appropriation right. The chief engineer, however, may require any person using water for any purpose to furnish information with regard to such use thereof. (History: L. 1957.)

K.S.A. 82a-706. Duties of chief engineer as to beneficial use and rights of priority of appropriation. The chief engineer shall enforce and administer the laws of this state pertaining to the beneficial use of water and shall control, conserve, regulate, allot and aid in the distribution of the water resources of the state for the benefits and beneficial uses of all of its inhabitants in accordance with the rights of priority of appropriation. (History: L. 1945; amended 1957.)

K.S.A. 82a-706a. Rules, regulations and standards. The chief engineer shall adopt, amend, promulgate, and enforce such reasonable rules, regulations, and standards necessary for the discharge of his or her duties and for the achievement of the purposes of this act pertaining to the control, conservation, regulation, allotment, and distribution of the water resources of the state. (History: L. 1957; amended 1977.)

K.S.A. 82a-706b. Diversion of water prohibited, when; unlawful acts; enforcement by chief engineer. It shall be unlawful for any person to prevent, by diversion or otherwise, any waters of this state from moving to a person having a prior right to use the same, or for any person without an agreement with the state of Kansas to divert or take any water that has been released from storage under authority of the state of Kansas or that has been released from storage pursuant to an agreement between the state and federal government. Upon making a determination of an unlawful diversion the chief engineer or his or her authorized agents, shall direct that the headgates, valves, or other controlling works of any ditch, canal, conduit, pipe, well, or structure be opened, closed, adjusted, or regulated as may be necessary to secure water to the person having the prior right to its use, or to secure water for the purpose for which it was released from storage under authority of the state of Kansas or pursuant to an agreement between the state and federal government. The chief engineer, or his or her authorized agents, shall deliver a copy of such a directive to the persons involved either personally or by mail or by attaching a copy thereof to such headgates, valves, or other controlling works to which it applies and such directive shall be legal notice to all persons involved in the diversion and distribution of the water of the ditch, canal, conduit, pipe, well, or structure. For the purpose of making investigations of diversions and delivering directives as provided herein and determining compliance therewith, the chief engineer or his or her authorized

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